Arlington municipal airport

Airport Master Plan

ARLINGTON MUNICIPAL AIRPORT
Arlington, Texas

AIRPORT MASTER PLAN

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Arlington Municipal Airport

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Arlington, Texas

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INTRODUCTION

Arlington Municipal Airport

INTRODUCTION

The Arlington Municipal Airport (GKY) Master Plan Study Update has been undertaken to evaluate the airport's capabilities and role, to forecast future aviation demand, and to plan for the timely development of new or expanded facilities that may be required to meet that demand. The ultimate goal of the master plan is to provide systematic guidelines for the airport's overall maintenance, development, and operation.

The master plan is intended to be a proactive document which identifies and then plans for future facility needs well in advance of the actual need for the facilities. This is done to ensure that the City of Arlington can coordinate project approvals, design, financing, and construction to avoid experiencing detrimental effects due to inadequate facilities.

Arlington Municipal Airport is located in the heart of the Dallas/Fort Worth Metroplex and serves as a vital economic asset for the City of Arlington. As such, it should be carefully and thoughtfully planned and subsequently developed in a manner which matches the developmental goals of the community. An important result of this master planning effort will be a comprehensive development plan tailored to meet future facility needs. A comprehensive and proactive development plan protects development areas and ensures they will be readily available when required to meet future needs.

The preparation of this master plan is evidence that the City of Arlington recognizes the importance of air transportation to the community, as well as the unique challenges operating an airport presents. The invest-

ment in an airport yields many benefits to the community and the region. With a sound and realistic master plan, Arlington Municipal Airport will remain an important link to the national air transportation system for the community and maintain the existing public and private investments in its facilities.

The City of Arlington supports a diverse and strong economic base. The city is home to the Texas Rangers Major League Baseball franchise, Six Flags Over Texas, General Motors, and many other successful business enterprises. Moreover, the Dallas Cowboys National Football League franchise is currently constructing a new stadium which will be near the ballpark of the Texas Rangers. Given the diverse and strong economic base in the City, it is imperative that the airport match the first class facilities that the community provides. This master plan will consider not only facility needs to meet demand, but also methods to ensure that the airport projects a first class image for the City.

MASTER PLAN OBJECTIVES

The primary objective of the master plan is to provide the community and its leadership with guidance for operating the airport in a safe and efficient manner while planning for future demand levels. Accomplishing this objective requires a comprehensive evaluation of the existing airport and a determination of what actions should be taken to maintain a safe and reliable airport facility while meeting the aviation needs of the region.

Aviation is a very dynamic industry which is experiencing significant change. Airports such as Arlington Municipal are experiencing significant growth due to the fastest growing segment of aviation, corporate aircraft use. The events of September 11th, 2001, have shifted some traditional airline passengers to the corporate aircraft market. Inconveniences and time lost due to security and large airport congestion have made corporate aircraft use more affordable and attractive. For this reason, general aviation airports in large demand centers, such as the City of Arlington and the Metroplex as a whole, need to be readied to meet the growing demand.

An airport master plan must be developed according to the Federal Aviation Administration (FAA) and Texas Department of Transportation (TxDOT) – Aviation Division requirements. However, the study can also be developed in a manner which makes it useful as a strategic business plan for the airport. FAA and TxDOT require specific components within a master plan. These components, detailed below, are guidelines which allow for a systematic and technical approach to reach the final development plan.

While the master plan is technical in nature, it can also be used by airport administration and city leaders as a tool to actively market the airport. In a sense, this airport master plan is very similar to a business plan. A business plan is often necessary in order to obtain investor or bank funds for planned capital growth. So too is a master plan, which ultimately will enable the City and airport to compete for state and federal grant funds.

This master plan will provide a vision for the airport covering the next 20 years and, in some cases, beyond. With this vision, the City of Arlington will have advance notice of potential future airport funding needs so that appropriate steps can be taken to ensure that adequate funds are budgeted and planned.

Specific objectives of the Arlington Airport Master Plan Update are:

& To preserve and protect public and private investments in existing airport facilities;

& To be reflective of community and regional goals, needs, and plans;

& To establish a schedule of development priorities designed to meet forecast aviation demand;

& To develop an orderly and comprehensive plan that is responsive to air transportation demands of the City and region as a whole;

& To enhance the safety of aircraft operations;

& To meet FAA and TxDOT airport design standards;

& To ensure that future development is environmentally compatible;

& To coordinate this master plan with local, regional, state, and federal agencies, and;

& To develop active and productive public involvement throughout the planning process.

The master plan will accomplish these objectives by carrying out the following:

& Determining projected needs of airport users through the year 2026;

& Analyzing socioeconomic factors likely to effect air transportation demand in the City of Arlington, including regional factors;

& Identifying existing and potential future land acquisition needs;

& Evaluating future airport facility development alternatives which will optimize undeveloped airport property to promote capacity and aircraft safety;

% Developing a realistic, commonsense plan for the use and expansion of the airport.

% Presenting environmental consideration associated with any recommended development alternatives;

% Producing current and accurate airport base maps and Airport Layout Plan (ALP) drawings.

MASTER PLAN ELEMENTS AND PROCESS

The Arlington Municipal Airport Master Plan Update is being prepared in a systematic fashion following FAA guidelines and industry-accepted principles and practices, as shown on **Exhibit IA**. The master plan has six chapters that are intended to assist in the discovery of future facility needs and provide the supporting rationale for their implementation.

Chapter One - Inventory summarizes the inventory efforts. The inventory efforts are focused on collecting and assembling relevant data pertaining to the airport and the area it serves. Information is collected on existing airport facilities and operations. Local economic and demographic data is collected to define the local growth trends. Planning studies which may have relevance to the master plan are also collected.

Chapter Two - Forecasts examines the potential aviation demand at the airport. The analysis utilizes local socioeconomic information, as well as national air transportation trends, to quantify the levels of aviation activity which can reasonably be expected to occur at Arlington Municipal Airport through the year 2026. The results of this effort are used to determine the types and sizes of facilities which will be required to meet the projected aviation demand at the airport through the planning period.

Chapter Three - Facility Requirements comprises the demand capacity and facility requirements analyses. The intent of this analysis is to compare the existing facility capacities to forecast aviation demand and determine where deficiencies in capacities (as well as excess capacities) may exist. Where deficiencies are identified, the size and type of new facilities to accommodate the demand are identified. The airfield analysis focuses on improvements needed to safely serve the type of aircraft expected to operate at the airport in the future, as well as navigational aids to increase the safety and efficiency of operations. This element also examines the general aviation terminal, hangar, apron, and support needs.

Chapter Four - Alternatives considers a variety of solutions to accommodate the projected facility needs. This element proposes various facility and site plan configurations which can meet the projected facility needs. An analysis is completed to identify the strengths and weaknesses of each proposed development alternative, with the intention of determining a single direction for development.

Chapter Five - Airport Plans provides both a graphic and narrative description of the recommended plan for the use, development, and operation of the airport. An environmental over-

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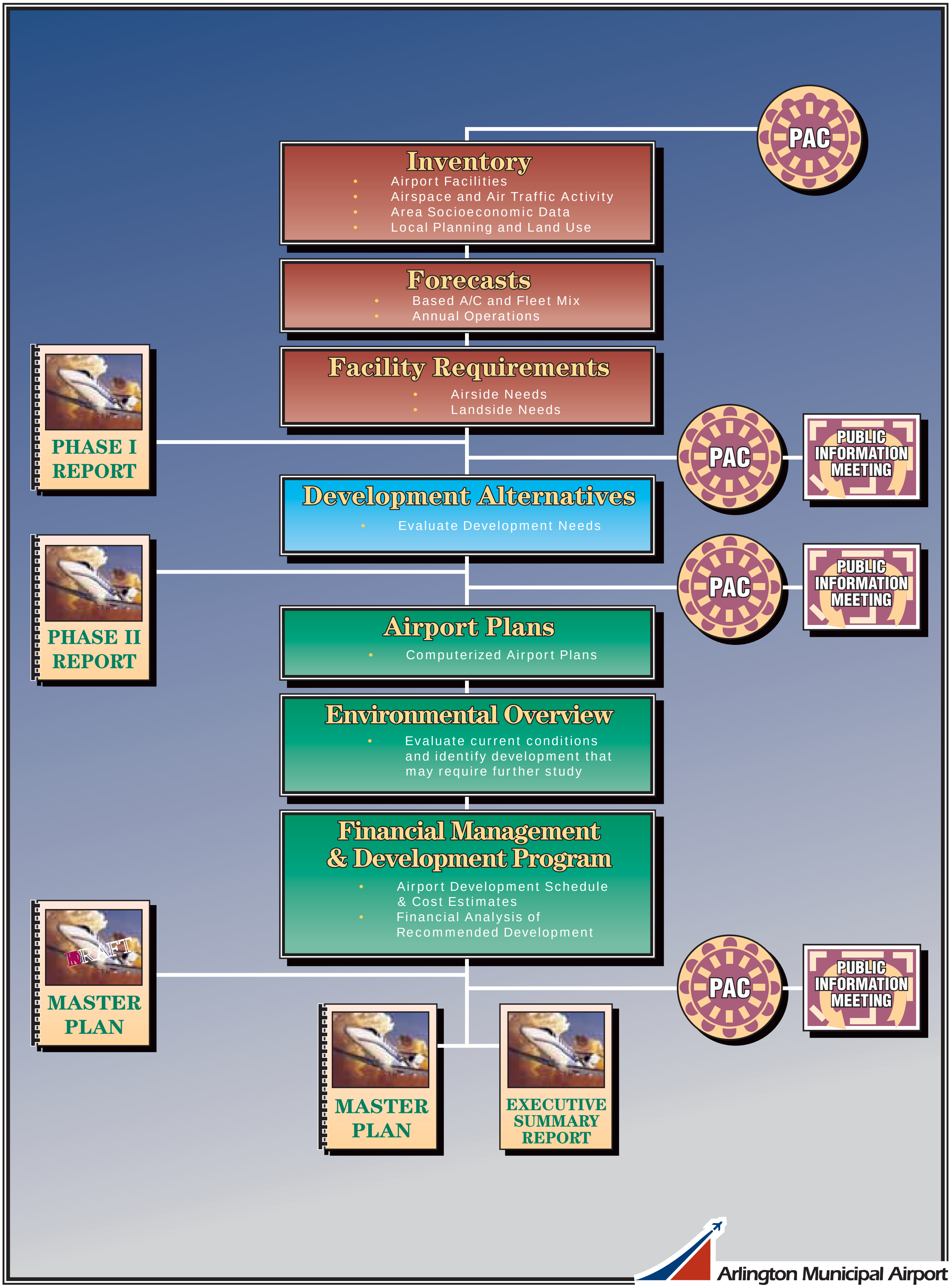

Exhibit IA
PROJECT WORK FLOW

view is also provided. The master plan also includes the official Airport Layout Plan (ALP) and detailed technical drawings depicting related airspace, land use, and property data. These drawings are used by the FAA and TxDOT in determining grant funding and improved instrument approach eligibility.

Chapter Six - Financial Plan focuses on the capital needs program which defines the schedules, costs, and funding sources for the recommended development projects.

COORDINATION

The Arlington Municipal Airport Master Plan Update is of interest to many within the local community. This includes local citizens, community organizations, airport users, airport tenants, area-wide planning agencies, and aviation organizations. As an important component of the regional, state, and national aviation systems, Arlington Municipal Airport is of importance to both state and federal agencies responsible for overseeing air transportation.

To assist in the development of the master plan, the City has identified a group of community members and aviation interest groups to act in an advisory role in the development of the master plan. Members of the Planning Advisory Committee (PAC) will review phase reports and provide comments throughout the study to help ensure that a realistic, viable plan is developed.

To assist in the review process, draft phase reports will be prepared at various milestones in the planning process. The phase report process allows for timely input and review during each step within the master plan to ensure that all master plan issues are fully addressed as the recommended program develops. At each milestone, the information completed to date will be presented to the public via open-house workshops and the internet. The workshops give the public an opportunity to view the working materials, ask questions, and provide feedback with the consultant, airport administration, and city officials. As a result, the master plan will be a comprehensive plan which reflects the goals of all its owners.

BACKGROUND

Any comprehensive master planning effort must factor all influences on an airport. Many of these factors are not directly aviation-related in nature, but do play a key role in the overall growth potential of the airport. Before the airport and its facilities are discussed, these outside influences should be identified. The following sections will discuss the factors which will influence the development potential at Arlington Municipal Airport.

LOCATION

Arlington Municipal Airport is located in the heart of the Metroplex, as depicted on **Exhibit IB**. Situated on ap-

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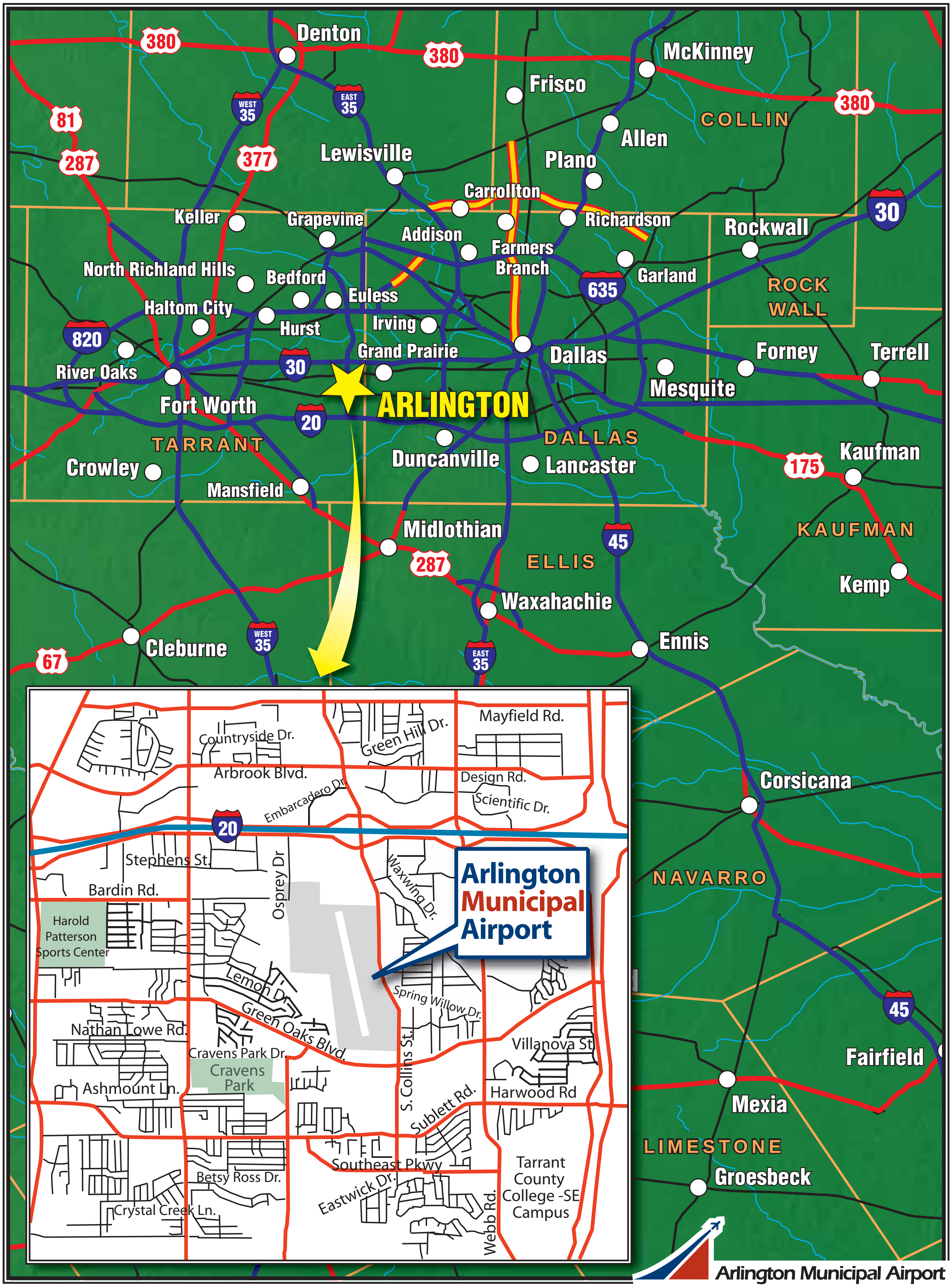

Exhibit IB
LOCATION MAP

proximately 500 acres of airport-owned property, the airport is fully within the city limits of the City of Arlington, Texas. The City of Arlington is located in eastern Tarrant County. Dallas County is adjacent to Arlington, just a few miles to the east. Arlington Municipal Airport is situated approximately five miles south of the central business district of the City of Arlington. Neighboring communities include Euless to the north, Grand Prairie to the east, and Fort Worth to the west.

REGIONAL TRANSPORTATION NETWORK

The City of Arlington has excellent access to major and regional highway infrastructure linking it to the entire Metroplex region. The Metroplex is served by several U.S. Interstates, including I-20, I-30, I-35, I-45, and loops I-635 and I-820. Interstate 35 directly links the Metroplex with Oklahoma City to the north and Austin to the south. Interstates 20 and 30 traverse the Metroplex east and west, while Interstate 45 originates in Dallas and links to Houston to the south. Loop I-635 serves the eastern and northeastern portion of Dallas area while I-820 serves the Fort Worth area.

The Airport is bounded on the north by U.S. Interstate 20 and on the south by Southeast Green Oaks Boulevard. Immediate access to the airport is provided by South Collins Street, a four-lane divided roadway, which borders the east side of the airport. South Collins Street provides a direct link to both Interstate 20 (and points beyond) to the north and Southeast Green Oaks Boulevard (and points beyond) to the south.

CLIMATE

Weather conditions must be considered in the planning and development of an airport, as daily operations are affected. Temperature is a significant factor in determining runway length needs, while local wind patterns (both direction and speed) can affect the operation and capabilities of the runway. The percentage of time that visibility is impaired due to cloud coverage or other conditions is a major factor in determining the need for navigational aids and lighting.

Located approximately 250 miles north of the Gulf of Mexico, the Metroplex, including the City of Arlington, experiences what can be characterized as a humid, subtropical climate with hot summers and mild winters. The average daily high temperature ranges from 54 degrees Fahrenheit (F) in January to 95 degrees F in both July and August. Average low temperatures range between 34 degrees F in January to 75 degrees F in July.

Average annual precipitation in the Arlington area is 35 inches. A large portion of the annual precipitation results from thunderstorm activity, with occasional heavy rainfall over brief periods of time. Thunderstorms occur throughout the year, but are most frequent during the spring months. The area receives little snowfall, but can experience freezing rain and icy conditions during winter months. Winds in the area are generally from the south, averaging between 9 and 13 miles per hour (10 – 15 knots). Complete climatic data is presented in **Table IA**.

TABLE IA
Climate Summary
Arlington, Texas

	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Wind speed (mph)	11	11.7	12.7	12.5	11	10.7	9.8	8.9	9.3	9.7	10.7	10.9
Sunshine (%)	52	54	57	61	57	67	74	73	67	64	57	52
Days clear of clouds	10	9	10	9	8	11	13	14	12	13	12	10
Partly cloudy days	6	5	8	8	9	11	11	12	9	7	8	6
Cloudy days	15	14	13	13	14	8	7	5	9	11	10	15
Precipitation (in.)	1.9	2.4	3.1	3.2	5.2	3.2	2.1	2.0	2.4	4.1	2.6	2.6
Average high temp.	54	60	68	76	83	91	95	95	88	78	65	56
Average low temp.	34	39	46	54	63	71	75	74	67	56	45	37

Sources: City-Data.com and Weather.com

AREA LAND USE AND ZONING

The area land use surrounding Arlington Municipal Airport is influenced solely by the City of Arlington. Review of existing and future land use and zoning plans is critical to understanding the growth potential of the airport. By understanding the land use issues surrounding the airport, appropriate recommendations can be made for the future.

Existing Land Uses

Arlington Municipal Airport is located within the corporate boundaries of the City of Arlington. Existing land uses immediately surrounding Arlington Municipal Airport include open/vacant and a mix of light industrial, manufacturing, and commercial business. There are areas of vacant/developable land adjacent to the airport, especially to the north, northwest, and south.

The airport is also located near significant residential developments. Large areas of single family residential developments are located to the east, west/southwest, and south of the airport. While these developments are relatively close, vacant and commercial/industrial uses provide a buffer to the residential development. **Exhibit IC** depicts the existing land uses in the vicinity of the airport.

Future Land Uses and Zoning

Exhibit ID depicts the City's existing zoning for the airport vicinity. The zoning map is very similar to the existing land use map as most areas around the airport are developed. The areas not currently developed are primarily zoned as commercial or industrial. These areas are zoned as such to provide a buffer between the airport and noise-sensitive uses.

The City's *1992 Comprehensive Plan* also discusses airport land use features. It states that places of public assembly shall be prohibited from locating in or adjacent to runway ap-

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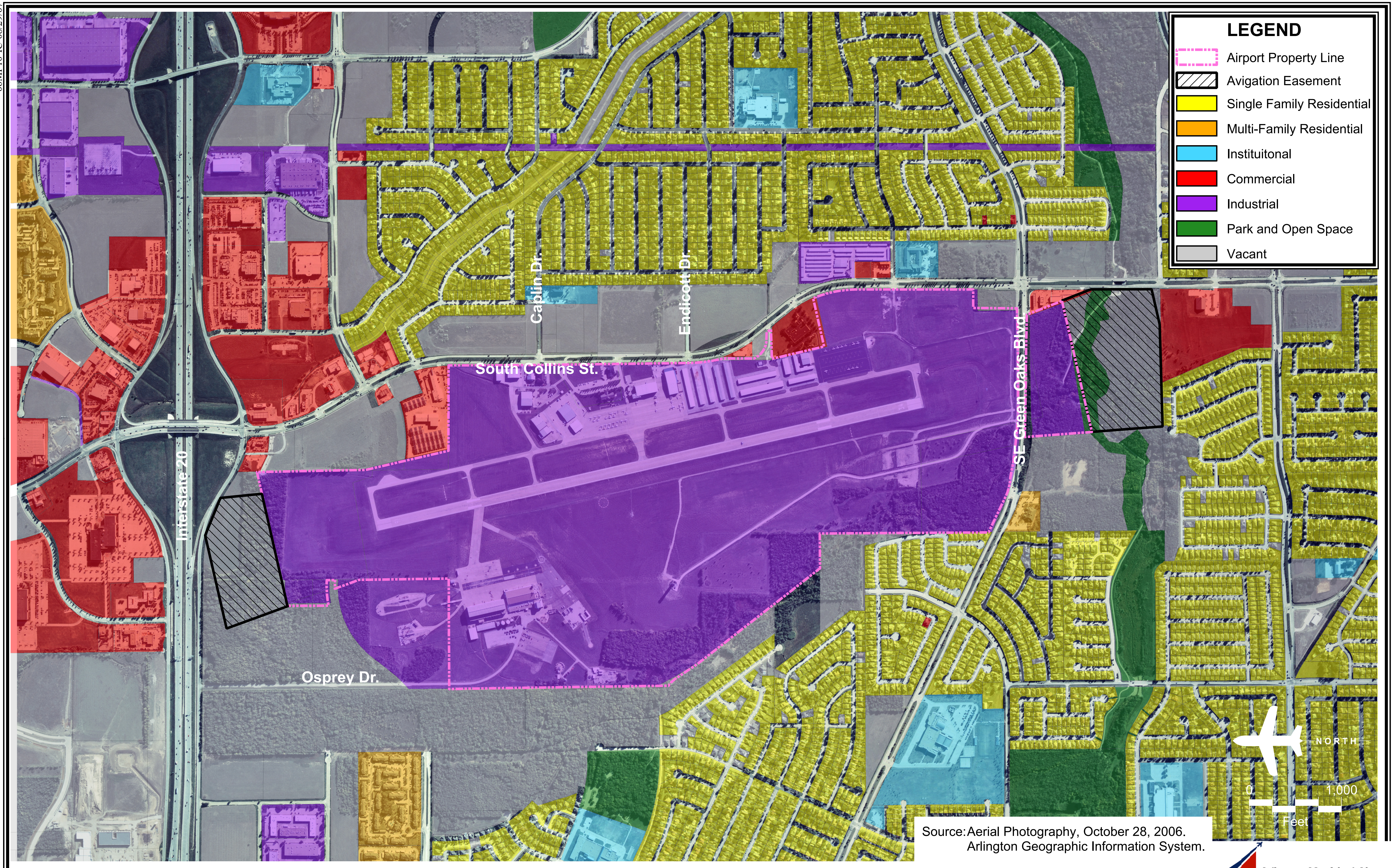

Source: Aerial Photography, October 28, 2006.
Arlington Geographic Information System.

Arlington Municipal Airport
Exhibit IC
EXISTING LAND USE

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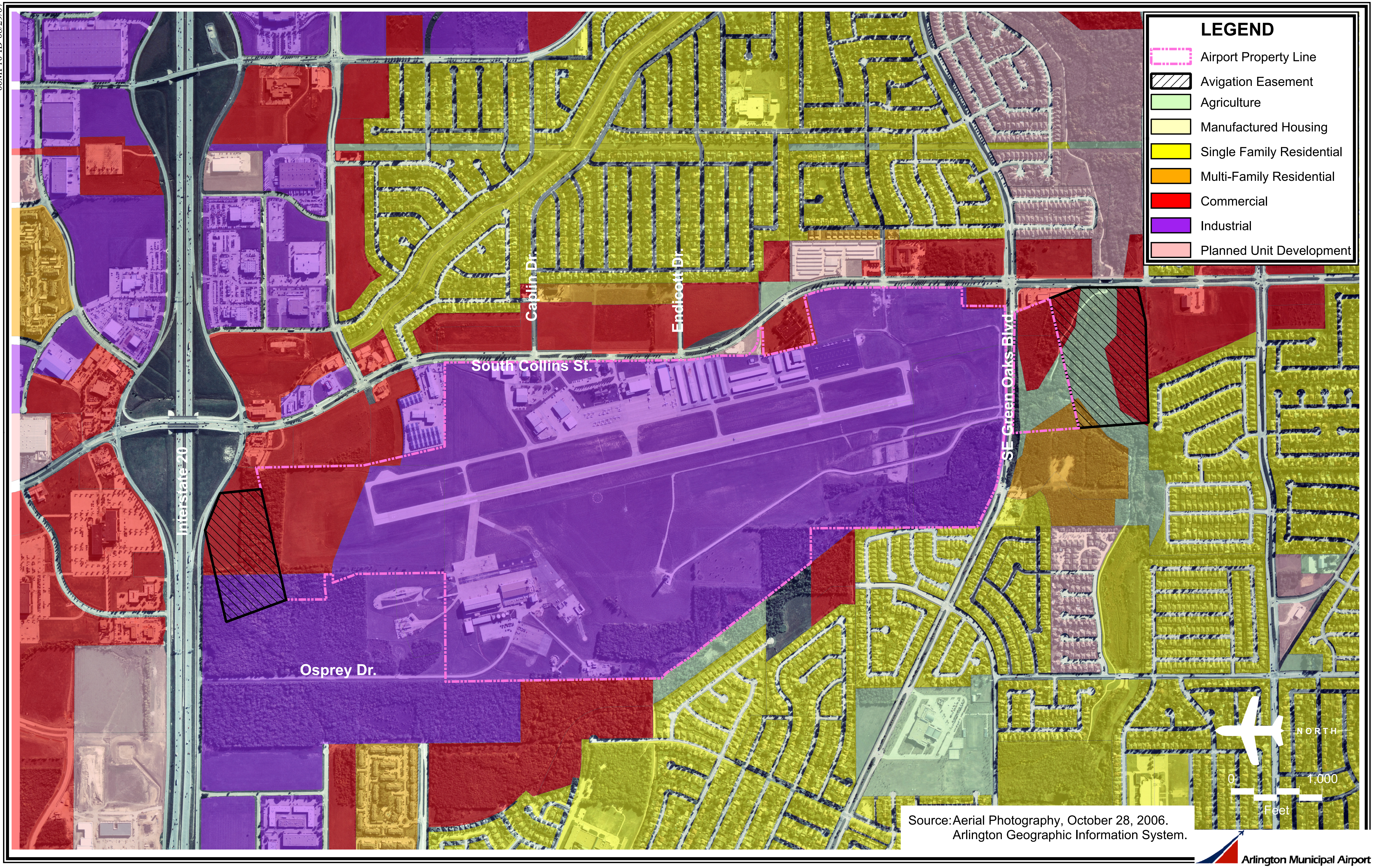

Arlington Municipal Airport
Exhibit ID
ZONING MAP

proach areas and that the airport shall be an asset to the City's Business Park and be utilized as a regional corporate hub. It continues by stating that policies to support noise and safety concerns, residential development, and commercial development should all be evaluated with careful consideration in order to protect and preserve the airport and its environs.

The City of Arlington has enacted *Zoning Ordinance Section 9-500: Airport Overlay ("AP") District* whereby standards identified in this district shall be in addition to the regulations of a standard zoning district within the City. This district has been established in order to "regulate the development of noise-sensitive land uses so as to promote compatibility between the airport and the surrounding land uses; to prevent encroachment of incompatible uses surrounding the airport; and to promote the public health, safety, and welfare of property owners." Several of the issues related to the City's Comprehensive Plan are detailed in this zoning ordinance.

The *2000 Interstate 20 Area Business Plan* also goes into detail recognizing the airport and its importance in developing land fronting Interstate 20 and State Highway 360, located a short distance away.

Finally, the use of the existing properties and planned future uses of land near the Arlington Municipal Airport include height and obstruction considerations. Within *Zoning Ordinance Section 9:500: Airport Overlay ("AP") District*, it discusses specific zones, based on the Federal Aviation Regulation (FAR) Part 77 airspace plan, to regulate the height of objects in the vicinity of the airport. It should be noted that the approach zone to Runway 34 at Arlington Municipal Airport has been zoned for a precision instrument approach, which will be implemented in the near future.

The height limitations are established to regulate and restrict the height of structures and objects of natural growth on and around the airport. The Ordinance establishes approach zones, transition zones, horizontal zones, and conical zones to protect both the lives and property of airport users and those in the airport vicinity. This ordinance gives the City the authority to limit natural and manmade objects from hindering safety of operations at the airport.

SOCIOECONOMIC CHARACTERISTICS

Socioeconomic characteristics are collected and examined to derive an understanding of the dynamics of growth within the study area. This information is essential in determining aviation demand level requirements, as most general aviation demand can be directly related to the socioeconomic condition of the area. Statistical analysis of population, employment, and income trends define the economic strength of the region and the ability of the region to sustain a strong economic base over an extended period of time.

Whenever possible, local or regional data is used for analysis. Population data for those areas in and around the Metroplex was obtained from the North Central Texas Council of Governments (NCTCOG). As the designated Metropolitan Planning Organization (MPO) for the greater Metroplex, NCTCOG publishes socioeconomic data for the region. The Texas Water Development Board (TWDB) publishes population statistics on a county and statewide basis. The Texas Office of the Comptroller also publishes population statistics that closely mirror those of the TWDB. Employment information is obtained from the Texas Workforce Commission. Income data is obtained from Woods & Poole Economics, Inc., a nationally recognized leader in demographic collection and analysis.

Population

Population is one of the most important socioeconomic elements to consider when planning for future needs of the airport. Historical population data for the City of Arlington, Tarrant and Dallas Counties, and the State of Texas are presented in **Table IB**.

TABLE IB
Historical Population Statistics

	1970	1980	1990	2000	2005	AAGR (1970-2005)
CITIES						
Arlington	90,229	160,113	260,721	332,969	364,039	4.06%
Bedford	10,049	20,821	43,762	47,152	48,638	4.61%
Cedar Hill	2,610	6,849	19,976	32,093	41,240	8.21%
Dallas	844,401	904,078	1,006,877	1,188,580	1,239,190	1.10%
Euless	19,316	24,002	38,149	46,005	50,786	2.80%
Fort Worth	393,455	385,164	447,619	534,694	580,152	1.12%
Grand Prairie	50,904	71,462	99,616	127,427	163,320	3.39%
Hurst	27,215	31,420	33,574	36,273	37,090	0.89%
Irving	97,260	109,943	155,037	191,615	207,639	2.19%
Mansfield	3,658	8,102	15,607	28,031	43,788	7.35%
COUNTIES						
Tarrant	715,587	860,880	1,170,103	1,446,219	1,642,950	2.40%
Dallas	1,327,696	1,556,419	1,852,810	2,218,899	2,305,450	1.59%
STATE						
Texas	11,196,730	14,229,191	16,986,510	20,851,820	22,859,970	2.06%
United States	205,052,174	227,224,681	248,709,873	281,421,906	296,410,404	1.06%

AAGR: Average Annual Growth Rate
Source: City of Arlington; North Central Texas 2030 Demographic Forecast (NCTCOG); U.S. Census Bureau

As presented in **Table IB**, the population for the City of Arlington has shown strong growth over the last 35 years increasing at an average annual growth rate (AAGR) of 4.06 percent. This growth rate was significantly higher than both Dallas and Fort Worth. It trailed only Bedford, Cedar Hill, and Mansfield, however, these are much smaller communities.

Tarrant and Dallas County populations are also shown for comparative purposes. The Tarrant County population increased at an AAGR of 2.40 percent over the 35 year period, outpacing Dallas County, which grew at an AAGR of 1.59 percent. This growth illustrates the emerging nature of Tarrant County as a whole, which is also illustrated in the City population figures.

The State of Texas shows a 2.06 percent annual growth rate from 1970 to 2005. This represents very strong growth when compared to other states. The population for the State of Texas and in particular, the Dallas/Fort Worth Metroplex, has outpaced national growth rates. The primary reason for the growth can be directly related to the availability of jobs spurred by strong economic growth, which will be discussed below.

Employment

Analysis of a community's employment base can be valuable in determining the overall well-being of that community. In most cases, the community's makeup and health is significantly impacted by the availability of jobs, variety of employment opportunities, and types of wages provided by local employers. Information for employment by industry for Tarrant County was obtained from the Texas Workforce Commission.

Table IC summarizes total employment data for the City of Arlington, Tarrant and Dallas Counties, and the State of Texas. As presented in the table, Arlington's total employment grew by nearly 66,000 jobs between 1990 and 2005. This increase represents an AAGR of 3.73 percent over the period.

The City of Arlington fares better than Tarrant and Dallas Counties, as well as the State of Texas and United States as a whole. In fact, based on data from the Texas Workforce Commission, the City has had the lowest unemployment rate of the compared areas over the last ten years. The strength of the local economy is impressive given the national economic slowdown coupled with the impacts of 9/11.

TABLE IC
Employment Characteristics

	1990	2000	2005	AAGR (1990-2005)
Arlington	90,100	140,947	155,953	3.73%
Tarrant County	625,702	864,360	985,109	3.07%
Dallas County	1,254,974	1,745,109	1,924,193	2.89%
State of Texas	8,951,715	9,960,436	10,629,606	1.30%

Source: NCTCOG; U.S. Census Bureau

The major employers in the City of Arlington are presented in **Table ID**. Understanding the types of employment opportunities will aid in identifying demand for general aviation services. As is common in most cities, the Arlington school district represents the largest employer with 8,000 employees. The second largest employer is the University of Texas at Arlington. Six Flags Over Texas is also a large local employer. As presented in the table, the largest employers are diverse, providing opportunities for a wide array of economic sectors.

TABLE ID
Major Employers
City of Arlington

Employer	Business	Employees
Arlington ISD	Education	8,000
University of Texas at Arlington	Education	5,700
Six Flags Over Texas	Hospitality/Tourism	3,200
General Motors	Manufacturing	3,000
The Parks at Arlington (Mall)	Retail	3,000
City of Arlington	Government	2,300
Texas Rangers Baseball Club	Hospitality/Tourism	1,800
Americredit	Finance	1,300
Arlington Memorial Hospital	Healthcare	1,300
Providian Financial	Finance	1,200
National Semiconductor	Manufacturing	1,100
Chase Bank Call Center	Finance	1,000
Doskocil Manufacturing	Manufacturing	1,000
Aetna US Healthcare	Insurance	950
Chase Bank of Texas, N.A.	Finance	900
Medical Center of Arlington	Healthcare	800
Siemens Dematic	Manufacturing	785
Tom Thumb	Grocery	770
Lear Corporation	Manufacturing	700
TDS Automotive	Manufacturing	700

Source: Arlington Chamber of Commerce (2005)

Per Capita Personal Income

Table IE compares the per capita personal income (PCPI), adjusted to 1996 dollars, for Tarrant and Dallas Counties, the State of Texas, and the United States between 1990 and 2005. As illustrated in the table, Tarrant County's PCPI has historically mirrored the country's PCPI. Over the period, Tarrant County PCPI has increased at an AAGR of 1.34 percent. Dallas County has experienced a greater PCPI increase over the period, growing by 1.6 percent annually.

TABLE IE
Personal Income per Capita (Adjusted to 1996 Dollars)

Area	1990	1995	2000	2005	AAGR (1990-2005)
Tarrant County	$22,784	$23,362	$28,345	$27,804	1.34%
Dallas County	$26,338	$26,963	$33,720	$33,425	1.60%
State of Texas	$20,245	$21,455	$26,486	$26,256	1.75%
United States	$22,634	$23,573	$27,919	$28,562	1.56%

Source: Woods and Poole, CEDDS (2006)

Tax Information

Texas is one of only four states that does not have a corporate income tax, and only one of seven states that does not have an individual income tax. A 6.25 percent state sales tax and a 1.75 percent city sales tax comprise Arlington's 8.00 percent sales tax rate.

Arlington Municipal Airport

Chapter One

INVENTORY

Arlington Municipal Airport

INVENTORY

CHAPTER 1

The inventory of existing conditions at Arlington Municipal Airport will serve as an overview of the airport as well as its role in regional, national, and state aviation systems. The information summarized in this chapter attempts to provide a foundation, or starting point, for all subsequent evaluations.

The update of this master plan required a comprehensive collection and evaluation of information relating to the airport including airport history, physical inventories, and descriptions of facilities and services currently provided by the airport, as well as the regional airspace, air traffic control, and aircraft operating procedures.

An accurate and complete inventory is an essential component of the master plan. The inventory of existing conditions serves primarily as a basis, or foundation, upon which most of the analysis conducted in later chapters is formed. This information was obtained through on-site investigations of the airport and interviews with airport management, airport tenants, representatives of various government agencies, and local and regional economic agencies.

AIRPORT HISTORY

The Arlington Municipal Airport began as an idea in the late 1950s and became a reality in the early 1960s. The city sold land that was originally donated for an airport and used the proceeds in conjunction with a matching grant from the Federal Aviation Administration (FAA) to purchase the

property of the present airport location. In 1962, Arlington Municipal Airport encompassed over 300 acres and provided a 4,000-foot paved runway.

In 1967, the City of Arlington entered into a lease agreement with Bell Aerospace Corporation. This was an important business transaction that has contributed to the growth and development of the airport over the past several years. In the late 1980s, the City of Arlington made several improvements to the airport including a 1,000-foot runway extension which helped attract additional aircraft operations and based aircraft. The FAA recognized the city and its airport as a vital aviation asset by designating the Arlington Municipal Airport as a "reliever" airport to the Dallas/Fort Worth International Airport (DFW) in 1991.

Since this time, several major capital improvement projects have been undertaken to spur more growth and development. Currently, the Arlington Municipal Airport has a 6,080-foot runway with a parallel taxiway system and a new airport traffic control tower (ATCT). There are also several aviation-related businesses on the field that provide an array of general aviation services.

RECENT CAPITAL IMPROVEMENTS

Table 1A summarizes a list of the major improvements made to Arlington Municipal Airport since 1988.

AIRPORT ADMINISTRATION

The Arlington Municipal Airport is owned and operated by the City of Arlington. The city employs a full-time airport manager and a full-time assistant airport manager. In addition, there are six full-time employees and two part-time employees which serve in administrative and maintenance capacities. The airport staff maintain a presence on the airport 24 hours per day, seven days per week. The airport is an independent business service unit within the City of Arlington's Economic Development Group. The Airport Manager reports to the Deputy City Manager over Economic Development.

THE AIRPORT'S SYSTEM ROLE

At the national level, the airport is included in the FAA *National Plan of Integrated Airport Systems* (NPIAS). The NPIAS includes a total of 3,431 existing airports that are significant to national air transportation and are therefore eligible to receive grants under the FAA Airport Improvement Program (AIP). The NPIAS supports the FAA's strategic goals for safety, system efficiency, and environmental compatibility by identifying specific airport improvements. An airport must be included in the NPIAS to be eligible for federal grant-in-aid assistance from the FAA. As Texas is one of eight "block-grant" states, the distribution of these funds is administered by the Texas Department of Transportation (TxDOT) - Aviation Division.

TABLE 1A
Projects and Improvements since 1988
Arlington Municipal Airport

Project Name	Total	FAA/State	City	Date
Runway extension (5,000 ft.); micro-surfacing; perimeter fencing; install MIRLs	$1,850,670	$1,665,603	$185,067	1988
Airport master plan update	$25,022	$22,520	$2,502	1988
Airport fencing	$19,888	$0	$19,888	1990
Construct south aircraft parking apron; taxiway reflectors	$680,891	$646,750	$34,141	1991
Land acquisition (24.2 acres west)	$371,500	$0	$371,500	1991
Land acquisition (14.85 acres southeast)	$34,449	$0	$34,449	1991
Land acquisition north RPZ (24.17 acres)	$1,291,721	$280,000	$1,011,721	1991
Auto parking; entrance drive; security gate	$382,981	$0	$382,981	1992
South T-hangar taxi lanes reconstruction	$160,138	$0	$160,138	1992
Airport master plan update	$79,524	$71,572	$7,952	1992
Automated Surface Observation System (ASOS)	$120,000	$120,000	$0	1992
Construction of aircraft wash pad	$53,398	$0	$53,398	1993
General aviation and itinerant apron; land reimbursement	$1,893,000	$1,703,700	$189,300	1993
PAPI (Runway 34)	$30,000	$30,000	$0	1993
Airport signage project	$46,935	$0	$46,935	1993
General aviation apron hangar taxi lane; drainage project	$813,342	$675,900	$137,442	1994
Environmental assessment	$74,761	$0	$74,761	1995
Concrete runway overlay; land reimbursement	$2,712,920	$2,298,007	$414,913	1995
Land acquisition south RPZ	$411,326	$0	$411,326	1995
Airport fencing	$21,997	$0	$21,997	1996
Land acquisition north runway extension and RPZ	$1,469,216	$0	$1,469,216	1996
Parallel taxiway relocation; land acquisition	$2,777,604	$2,499,844	$277,760	1997
T-hangar taxi lane reconstruction	$324,560	$0	$324,560	1997
Demolition of fuel farm	$17,994	$0	$17,994	1998
South apron rejuvenator seal	$32,687	$10,000	$22,687	1998
Land acquisition RPZ (NW 3.39 acres fee; 6.39 acres easement)	$430,000	$0	$430,000	1998
Airport master plan update	$49,840	$0	$49,840	1999
Runway extension (6,080 ft.) design; reimbursement environmental assessment and master plan	$489,667	$440,700	$48,967	2000
RAMP asphalt crack seal and remarking	$27,356	$13,678	$13,678	2000
Runway extension (6,080 ft.) construction; land reimbursement	$4,179,488	$4,134,695	$44,793	2001 & 2002
Land reimbursement (N RPZ 5,000 ft.)	$512,859	$433,779	$79,080	2003
Air traffic control tower (ATCT)	$2,260,536	$1,375,000	$885,536	2003
Construct ATCT road; install utility lines and security gate	$860,105	$641,667	$218,438	2003
Land reimbursement (N RPZ 6,080 ft.)	$1,535,951	$1,153,128	$382,823	2004
RAMP erosion and drainage improvements	$98,935	$35,922	$65,123	2005/6
RAMP south apron seal coat; striping and parallel taxiway re-striping	$46,277	$23,138	$23,139	2005

TABLE 1A (Continued) Projects and Improvements since 1988 Arlington Municipal Airport				
Project Name	**Total**	**FAA/State**	**City**	**Date**
Instrument landing system (ILS) – grant only	$2,500,000	$2,500,000	$0	2005
Pavement rehabilitation design for T-hangar aprons; runway precision markings and grading of ILS glide slope critical area	$164,990	$148,491	$16,499	2006
Airport master plan update	$250,000	$225,000	$25,000	2006/7
Pavement rehabilitation (construction) – grant only	$3,000,000	$2,700,000	$300,000	2007
Totals	$32,102,528	$23,849,094	$8,255,544	
Source: Airport and TxDOT records				

The 2007-2011 NPIAS identifies $41.2 billion for airport development across the country. Of that total, approximately seven percent is designated for the 274 reliever airports. Reliever airports are located in major metropolitan areas and serve to provide pilots with an attractive alternative to using busy commercial service airports. Moreover, these airports provide a vital function of relieving congestion at capacity-constrained airports such as DFW International. Arlington Municipal Airport is one of 21 designated reliever airports in the State of Texas and one of 11 located in the Dallas/Fort Worth Metroplex region. According to the NPIAS, reliever airports across the country have an average of 232 based aircraft and account for 29 percent of the nation's total active aircraft fleet.

The Texas Airport System Plan (TASP) further classifies Arlington Municipal Airport in its system plan as a Transport Airport. Transport airports are designed to provide facilities to meet the needs of turboprop and turbojet business aircraft, as well as smaller single-engine and twin-engine piston-powered aircraft. The TASP provides for specific minimum design standards for runway length, a parallel taxiway, apron size, approaches, airfield lighting, terminal services, aircraft fuel, and hours of operation.

ECONOMIC IMPACTS

The last formal economic impact study of the airport was completed by TxDOT in 2002. This study analyzed the direct and indirect economic impacts of all public use airports in Texas, including Arlington Municipal Airport. At the time, it was estimated that Arlington Municipal Airport had a total economic impact of $125.8 million annually on the local economy.

The total economic impact of the airport includes the direct effects of employment, payroll, and sales. Indirect benefits would include visitor spending, which leads directly to off-airport employment, payroll, and sales. The cumulative economic benefit of an airport includes a multiplier effect which is essentially the recycling of money within the local economy to create more jobs in nearly every economic sector.

On-airport direct economic benefits include 425 jobs, with a payroll of $15.7 million and sales of $47.5 million. Visitor spending accounts for 180 additional jobs, $3.7 million in payroll, and $6.0 million in sales. When the multiplier effect is applied, economic activity generated by Arlington Municipal Airport accounts for 1,023 local jobs, $31.7 million in payroll, and $94.1 million in sales. These figures are very impressive as most reliever airports typically generate less than $50 million in total impacts and fewer than 500 jobs.

AIRSIDE FACILITIES

Airport facilities can be categorized into two broad categories: airside and landside. The airside category includes those facilities which are needed for the safe and efficient movement of aircraft such as runways, taxiways, lighting, and navigational aids. The landside category includes those facilities necessary to provide a safe transition from surface to air transportation and support aircraft servicing, storage, maintenance, and operational safety. Airside facilities at Arlington Municipal Airport are identified on **Exhibit 1A**. **Table 1B** summarizes airside facility data.

TABLE 1B
Airside Facility Data
Arlington Municipal Airport

	Runway 16-34
Runway Length (feet)	6,080
Runway Width (feet)	100
Runway Surface Material	Concrete
Surface Treatment	None
Condition	Good
Pavement Markings	Non-precision
Runway Load Bearing Strength (lbs.):	
Single Wheel Loading (SWL)	60,000
Runway Lighting	(MIRL)
Taxiway Lighting	(MITL) and green centerline reflectors
Approach Lighting	REILs and 4-light PAPIs
Visual Aids	Rotating Beacon Lighted Windcone Segmented Circle
Weather Aids	ASOS
Instrument Approach Aids	VOR/DME - 34 RNAV (GPS) - 34

PAPI - Precision Approach Path Indicator
ASOS - Automated Surface Observation System
MIRL - Medium Intensity Runway Lighting
MITL - Medium Intensity Taxiway Lighting
REIL - Runway End Identifier Lights
VOR/DME - Very high frequency Omnidirectional Range / Distance Measuring Equipment
GPS - Global Positioning System

Source: Airport Facility Directory - South Central (August 2006)

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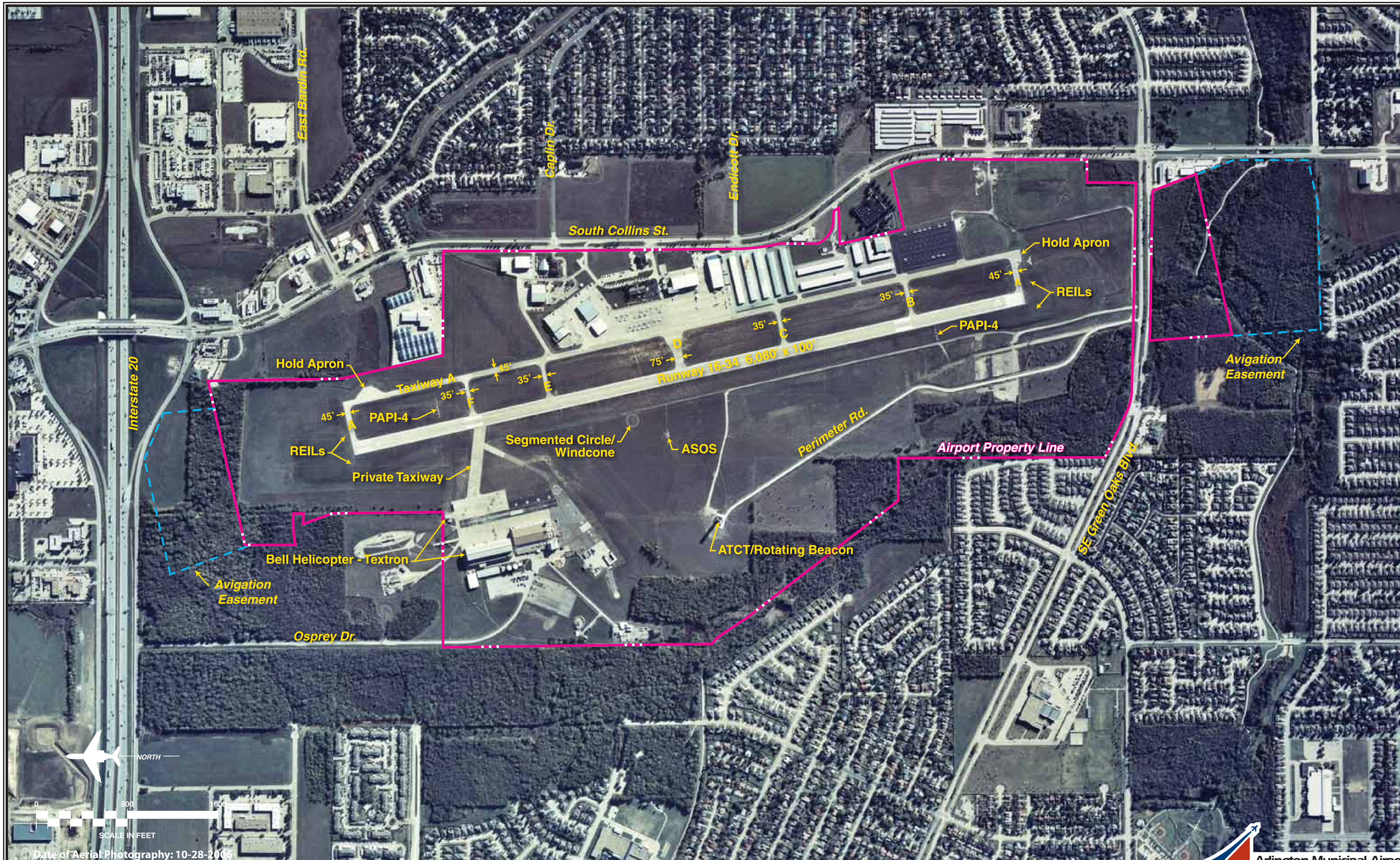

Exhibit 1A
EXISTING AIRSIDE FACILITIES

RUNWAY

Arlington Municipal Airport is served by a single runway orientated in a northwest/southeast manner. Runway 16-34 is 6,080 feet long by 100 feet wide and is in "good" condition. Runway 16-34 has been strength-rated at 60,000 pounds single wheel gear loading (SWL). SWL refers to the design of aircraft landing gear which has one wheel on each landing gear strut. This weight-bearing strength is adequate to accommodate nearly all aircraft in the general aviation fleet today.

TAXIWAYS

The taxiway system at Arlington Municipal Airport includes a full-length parallel taxiway, identified as Taxiway A, and seven entrance/exit taxiways. All airfield taxiways are constructed of concrete, strength-rated at 60,000 pounds SWL, and in good condition. Taxiway A is 45 feet wide and located 400 feet (centerline to centerline) to the east of Runway 16-34.

The seven taxiways providing entrance to or exit from the runway are identified as Taxiway A (the far north and south entrance/exit), and Taxiway B, C, D, E, and F, as one moves from south to north. Taxiways B, C, E, and F are 35 feet wide. Taxiway D is 75 feet wide at the runway intersection and expands to 200 feet in width as it connects to the main aircraft apron.

A taxiway system on the northwest side of Runway 16-34 across from Taxiway F is used exclusively for Bell Helicopter-Textron, Inc. private operations. These taxiways range from 600 feet to 900 feet in length and 40 feet to 100 feet in width.

There are several taxi lanes which link private hangar development and T-hangar complexes on the east side of the airfield to parallel Taxiway A. These taxiways are strength-rated at 12,500 pounds SWL.

RUNWAY AND TAXIWAY LIGHTING

Runway and taxiway edge lighting are placed near the pavement edge to define the lateral limits of the pavement surface. This lighting is essential for safe operations during night and/or times of low visibility in order to maintain safe and efficient access to and from the runway and aircraft parking areas. This is especially true for airports serving high performance and large aircraft.

Runway 16-34 is equipped with medium intensity runway lighting (MIRL). These are lights set atop a pole that is approximately one foot above the ground. The light poles are frangible, meaning if one is struck by an object, such as an aircraft wheel, they can easily break away, thus limiting the potential damage to an aircraft.

Both ends of the runway are equipped with threshold lighting. Threshold lighting consists of specially designed light fixtures that are red on the departure side and green on the arrival side. The taxiways are supported with medium intensity taxiway lighting (MITL) and green centerline reflectors. These lights are mounted on the same type of structure as the runway lights.

PAVEMENT MARKINGS

Pavement markings aid in the movement of aircraft along airport surfaces and identify closed or hazardous areas on the airport. The non-precision markings on Runway 16-34 identify the runway designation, centerline, edges, touchdown zone, threshold, and aircraft holding positions. The holding positions have been placed on the entrance/exit taxiways 250 feet from the runway centerline as required by the FAA and TxDOT.

Taxiway and taxi lane centerline markings are provided to assist aircraft using these airport surfaces. Pavement edge markings are present on Taxiway A. Pavement markings also identify aircraft tie-down positions on the various apron surfaces. It should be noted that an auto access road is delineated on the general ramp apron, aligned parallel to Taxiway A, which provides a controlled designated movement area for airport operators (e.g., airport personnel, fuel trucks, etc.). **Exhibit 1B** depicts examples of current airport markings as well as other navigational aids.

AIRFIELD SIGNAGE

Airfield identification signs assist pilots in identifying their location on the airfield and directing them to their desired location. Lighted airfield signs at Arlington Municipal Airport are installed on all taxiway and runway intersections. The signs are located parallel to the hold lines, giving further indication to pilots where the hold positions are located.

VISUAL AIDS

The location of the airport at night is universally indicated by a rotating beacon, displaying alternating flashes of green and white lights 180 degrees apart. The rotating beacon at Arlington Municipal Airport is located on top of the newly constructed ATCT on the west side of the airport.

The airport is also supported by a segmented circle and a lighted windcone. The segmented circle is located on the west side of the airfield approximately midfield and 300 feet from the runway centerline. The segmented circle provides pilots with information on the airport's traffic pattern. The airport has a standard "left-hand" traffic pattern which directs pilots to make left-hand turns while in the vicinity of the airport. The lighted windcone is co-located with the segmented circle. The windcone provides pilots with wind direction and general speed information.

APPROACH AIDS

Four-box precision approach path indicators (PAPI-4) are located to the left side of each runway end. A PAPI consists of a system of lights located approximately 1,000 feet from the

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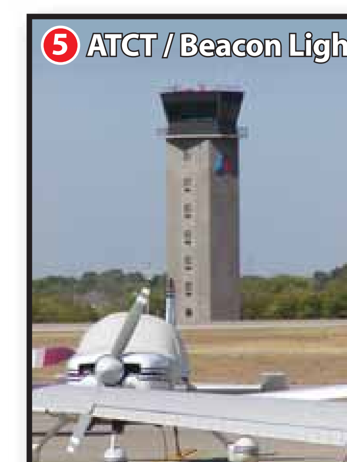
1 Runway 16


2 REILs (South End)


3 PAPI-4 unit (North End)


4 Wind Cone/Segmented Circle


5 ATCT / Beacon Light


6 Runway Threshold Lights


7 Taxiway Markings and Signage


8 ASOS


9 Medium Intensity Taxiway Lighting and Signage

Arlington Municipal Airport

Exhibit 1B
AIRPORT NAVIGATIONAL AIDS, LIGHTING, AND MARKINGS

runway threshold. When interpreted by pilots, these lights give an indication of being above, below, or on the designated descent path to the runway. The PAPI units have been installed to provide a three-degree descent path to both runways. The PAPIs at Arlington Municipal Airport are maintained by the FAA.

RUNWAY END IDENTIFICATION LIGHTS

Runway end identification lights (REILs) provide rapid and positive identification of the approach end of the runway. The REIL system consists of two synchronized flashing lights located laterally on each side of the runway threshold facing the approaching aircraft. REILs are installed on both ends of Runway 16-34. The REILs are maintained by the FAA.

WEATHER REPORTING AIDS

Arlington Municipal Airport is equipped with an Automated Surface Observation System (ASOS). The ASOS provides automated aviation weather observations 24 hours a day. The system updates weather observations every minute, continuously reporting significant weather changes as they occur. The ASOS reports cloud ceiling, visibility, temperature, dew point, wind direction and speed, altimeter setting (barometric pressure), density altitude (airfield elevation corrected for temperature), precipitation identification, and freezing rain occurrence.

The ASOS is located 400 feet west of the runway centerline and approximately 2,800 feet from the Runway 16 threshold as depicted on **Exhibits 1A** and **1B**. The information collected by the ASOS is broadcast via a computer-generated voice directly to aircraft in the vicinity of the airport using VHF ground-to-air radio. The frequency for pilots to receive this information is 127.375 MHz. In addition, the same information is available through a dial-in telephone number (817-557-0251).

LANDSIDE FACILITIES

Landside facilities are the ground-based facilities that support the aircraft and pilot/passenger handling functions. These facilities typically include the terminal building, aircraft storage/maintenance hangars, aircraft parking aprons, and support facilities such as fuel storage, automobile parking, roadway access, air traffic control tower, and aircraft rescue and firefighting. Landside facilities at Arlington Municipal Airport are identified on **Exhibit 1C**.

AIRPORT TRAFFIC CONTROL TOWER

A new, state-of-the-art ATCT was recently constructed and became fully operational on September 1, 2006. Control towers provide for a safe, orderly, and expeditious flow of traffic on and in the vicinity of an airport, allowing for smooth transition of aircraft from air-to-ground and vice versa. Airports, such as Arlington Municipal

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Exhibit 1C
EXISTING LANDSIDE FACILITIES

Airport, that serve a population of pilots with varying skill levels and a wide variety of aircraft, are well-served by the ATCT, which provides aircraft identification and separation services.

The ATCT at Arlington Municipal Airport is located along the west side of the airport in a nine-story building. The ATCT is operational from 0700 – 2100 (7:00a.m. – 9:00 p.m.) daily and has six individuals plus one tower manager on staff provided by an FAA contractor. Tower personnel provide an array of control services including tower control (128.625), ground control (121.625), and clearance delivery (118.85). When the tower is closed, clearance delivery can be obtained via regional approach/departure control (135.975).

TERMINAL BUILDING

There is a dedicated general aviation terminal building that was constructed by the city in 1982. The building is located east of the main aircraft parking apron on the east side of the airport. The facility is multi-functional, providing space for flight planning facilities, a conference room, a public lobby, restrooms, airport administrative offices, and some commercial space. The terminal building provides approximately 7,000 square feet of enclosed space.

AIRCRAFT HANGARS

Hangar facilities at Arlington Municipal Airport are comprised of T-hangars, conventional hangars, and executive hangars. T-hangars provide for separate storage facilities within a larger contiguous facility. Conventional hangars provide a large open space, free from roof support structures, and have the capability to store several aircraft simultaneously. Conventional hangars are typically 10,000 square feet or larger. Often conventional hangars are owned or leased by an airport business such as a fixed base operator (FBO). Executive hangars have the same open space design as conventional hangars, but they are typically smaller than 10,000 square feet. Executive hangars are typically utilized by individual owners to store several aircraft or by smaller airport businesses. **Table 1C** lists the hangar facilities at Arlington Municipal Airport. These facilities are also identified on **Exhibit 1C**.

TABLE 1C
Hangar Facilities
Arlington Municipal Airport

Hangar Type	Square Feet (Hangar and Office)	Max. # of Aircraft	Occupant	Ownership	Labeled on Map
Executive	6,050	4	Conner Flying Services	Private	1A
Conventional	13,000	8	Airline Transport Professionals	Private	1B
Executive	26,000	7	Global Helicopter	Private	1C
Executive	15,540	9	Van Bortel Aircraft	Private	1D
Executive	21,336	11	Cothron Aviation/Multi-Engine Training	Private	1E
Conventional	10,200	4	Langley, Inc.	Private	1F
Conventional	10,800	5	Van Bortel Aircraft	City	1G
Conventional	34,000	10	Harrison Aviation	Private	1H
Conventional	31,000	13	Harrison Aviation/ Sky Mates	Private	1J
T-Hangar	21,672	20	Individuals	City	1K
T-Hangar	21,672	20	Individuals	City	1L
T-Hangar	21,672	20	Individuals	City	1M
T-Hangar	19,608	18	Individuals	City	1N
T-Hangar	19,608	18	Individuals	City	1P
T-Hangar	21,800	20	Individuals (FMF Corp.)	Private	1Q
T-Hangar	28,136	20	Individuals (FMF Corp.)	Private	1R
T-Hangar	13,992	13	Individuals (Airport Properties)	Private	1S
Executive	10,264	6	Individuals (Airport Properties)	Private	1T
Executive	7,605	4	Individuals (Airport Properties)	Private	1U
Executive	4,704	3	Individuals (Airport Properties)	Private	1V
Executive	9,600	5	Trinity River Authority	Private	1W
Conventional	Approx. 100,000		Bell Helicopter-Textron, Inc.	Private	West Airfield
Conventional	Approx. 100,000		Bell Helicopter-Textron, Inc.	Private	West Airfield
Totals	**568,259**	**239**			

Source: Airport records

GENERAL AVIATION SERVICES

A full range of aviation services are available at Arlington Municipal Airport. This includes aircraft rental, flight training, aircraft maintenance, aircraft charter, aircraft fueling, and many other services. The airport is served by one full service fixed base operator (FBO), Harrison Aviation. The following provides a brief discussion of general aviation services at the airport.

City of Arlington provides airport management and operations oversight, aircraft hangar rental, and tie-down rental.

Harrison Aviation is the airport's only FBO and currently operates out of two hangars which total approximately 55,000 square feet. They employ 13 full-time and two part-time personnel and are planning on expanding their services at the airport in the future. Harrison Aviation provides a full array of general aviation services including fuel (100LL and Jet A), passenger terminal/lounge, catering, 24/7 operations, flight planning, internet, aircraft maintenance, lavatory services, auxiliary power unit (APU) services, courtesy transportation, pilot lounge/snooze room, and conference room.

Airline Transport Professional (ATP) is a professional flight training school that operates Piper Seminole PA-44s, Cessna 172s, and Diamond PA-40s. The number of aircraft the operator bases on the airport varies based on the number of students enrolled in their flight training programs. ATP employs approximately 10 people, operates out of a 13,000 square-foot hangar, and conducts classroom training in a separate building located on the airport.

Van Bortel Aircraft, Inc. specializes in aircraft and avionics sales and service. The operator also distributes aircraft engines and parts. Van Bortel operates out of two hangars at the airport totaling 27,000 square feet. They employ 30 people and plan on expanding their sales and product lines in the future.

Bell Helicopter-Textron, Inc. operates its private business at the airport to include a major research and development center where helicopters and tilt-rotor aircraft are designed and flight-tested. Bell is the largest employer on the airport with between 300 and 400 people, and operates out of two large hangars, each with office space, totaling approximately 200,000 square feet. The number of based aircraft (helicopters) varies and depends on the types of projects they are conducting. They utilize a private air traffic control tower manned by up to two individuals only when flight testing is being conducted specific to their operations. The tower is attached to one of their hangars and provides no public services for general aviation aircraft utilizing the airport.

Conner Flying Services, Inc. provides aircraft maintenance, sales, and flight instruction.

Delta Qualiflight provides flight training.

Global Helicopter operates a helicopter engineering and refurbishing facility.

Katie Hawk Aviation provides flight instruction and aircraft rental.

Multi-Engine Training operates a flight school and aircraft A&P maintenance inspection program.

Plane Texans, Inc. provides aircraft sales.

Sky Mates provides aircraft rental and also operates a pilot shop.

Victor Aviation is an aircraft fastener supply company.

There are several private companies on the airport that offer aircraft hangar and office rental. They include **Airport Properties, Inc.**, **Airport Properties USA**, **Cothron Aviation, LLC**, and **FMF Corporation**.

Other businesses/entities on airport property include **Trinity River Authority** which is a State of Texas Agency operating out of a private hangar; **Latin American Aeronautical**

Association which is an aviation association; **Frank Holt & John James & Associates** which is an insurance consulting agency; **Langley, Inc.** which operates out of a private hangar; **Bill Lawson** who specializes in aircraft cabinetry; **Mike Williaford** who is an aircraft broker; **Channel 5** which bases its corporate flight department on the airport; **L.E. Barkholtz, P.C.** who is an attorney; and **Enterprise Leasing Company** which is an automobile rental agency.

AIRCRAFT PARKING APRONS

There are three aircraft aprons utilized for public aircraft parking and tie-down at Arlington Municipal Airport. The terminal aircraft parking apron is located directly in front of the terminal building and an itinerant aircraft parking apron is located in front of Harrison Aviation as identified on **Exhibit 1C**. These aprons provide approximately 37,300 square yards and 34 marked tie-down positions. The south apron consists of approximately 23,400 square yards of space and has 48 marked tie-down positions. The north apron space provides overhead lighting to better facilitate nighttime operations. The north apron is strength-rated at 60,000 SWL, while the south apron is strength-rated at 30,000 SWL. There are also aviation aprons in several locations north of the airport terminal building adjacent to separate aviation-related businesses which totals approximately 13,300 square yards.

AIRCRAFT WASH RACK

An aircraft wash rack is located on the east side of the airport approximately 800 feet south of the airport terminal building. It was constructed in 1993. This facility allows aircraft owners to wash their aircraft and is constructed to ensure proper drainage of run-off water and cleaners.

AUTOMOBILE PARKING

There are several parking lots available for vehicle parking at Arlington Municipal Airport. The airport terminal building parking lots provide approximately 70 total parking spaces. There is a second parking lot, east of the terminal building, adjacent to Fire Station #12, which provides an additional 60 spaces, two of which are designated handicapped.

Harrison Aviation, located south of the terminal building, has 80 parking spaces, two of which are designated as handicapped. There are also several parking spaces north of the terminal building associated with many different businesses on the airport. These spaces total approximately 250, ten of which are designated handicapped. The total number of formal parking spaces is approximately 500. All the parking areas are in fair to good condition. Most aircraft owners can drive their vehicles to their hangar rather than park in identified parking and walk to their aircraft. On the west side of the airfield, Bell Helicopter-Textron, Inc. maintains approximately 500 parking spaces for its customers and employees.

AIRPORT ROADS

Primary access to the airport is provided by South Collins Street. There are five entrance/exit points available to the airport via South Collins Street. South Collins Street runs along the entire east side of the airport and connects with Interstate 20 approximately two miles to the north and Southeast Green Oaks Boulevard, and points beyond, to the south.

Osprey Drive provides access to the Bell Helicopter facility on the northwest side of the airport. There is a perimeter airport road which extends off Green Oaks Boulevard providing access to the ATCT on the west side of the airport. This road is not open to the public and is gated to control access.

FUEL FACILITIES

Harrison Aviation is the only fuel provider on the airfield, and owns the fuel farm and dispenses fuel via fuel trucks. The fuel farm consists of three 12,000-gallon aboveground storage tanks. The storage tanks, one for Avgas and two for Jet A fuel, are located approximately 1,600 feet south of the airport terminal building. Jet A fuel is delivered by the FBO to aircraft via one of two trucks, one with a 5,000-gallon capacity and one with a 3,000-gallon capacity. Avgas fuel is delivered to aircraft via either a 1,200-gallon capacity truck or 1,000-gallon capacity truck.

Harrison Aviation also recently installed self-service fueling capability at Arlington Municipal Airport. An area encompassing approximately 500 square yards, located on the southeastern corner of the south ramp apron, has been dedicated for self-service Avgas fueling. This facility consists of a fuel dispenser, credit card reader, and 1,000-gallon fuel tank.

AIRCRAFT RESCUE AND FIREFIGHTING (ARFF)

The City of Arlington's Fire Station #12 is located on the airport immediately to the east of the airport terminal building. The Station fronts South Collins Street and is primarily designed to provide City of Arlington fire services. Fire Station #12 has three personnel present 24 hours a day, seven days per week, and provides service to both the surrounding area and the airport. One 750-gallon capacity fire engine and one 1,000-gallon capacity brush truck are kept at the facility, and the station also maintains specialized foaming agents designed for use with aircraft fires. Although the station is not ARFF certified by the FAA, personnel go through regular training related to ARFF.

SECURITY FENCING

The airport is totally enclosed with perimeter security fencing. There are control access gates near the terminal building and leading to the air traffic control tower. There are also several manual gates located around the airport's perimeter.

UTILITIES

The availability and capacity of the utilities serving the airport are factors in determining the development potential of the airport property, as well as the land immediately adjacent to the facility. Utility availability is a critical element when considering future expansion capabilities of an airport, both airside and landside components.

The airport is supplied by water, sanitary sewer, and storm water services via the City of Arlington's system. Electrical service is provided to the airport by TXU Delivery with new service lines. The City of Arlington supplies fiber optics and Time Warner supplies television cable service. Telephone service is provided by AT&T. Natural gas is not currently supplied to the airport. Later in this document, the possibility of extending utilities to the west side of the airport will be discussed.

AREA AIRSPACE AND AIR TRAFFIC CONTROL

This section identifies factors influencing air navigation at and in the vicinity of Arlington Municipal Airport. Consideration of these additional elements, such as area navigational aids, area airspace classification, and approved instrument approach procedures, is necessary as they have a direct impact on aircraft using Arlington Municipal Airport.

ENROUTE NAVIGATIONAL AIDS

Navigational aids are electronic devices that transmit radio frequencies which pilots of properly equipped aircraft can translate into point-to-point guidance and position information. The types of electronic navigational aids available for aircraft flying to or from Arlington Municipal Airport include non-directional beacon (NDB), very high frequency omni-directional range (VOR) facilities, global positioning system (GPS), and an instrument landing system (ILS), which will become operational within the next year.

The NDB transmits non-directional radio signals whereby the pilot of an aircraft equipped with direction-finding equipment can determine the bearing to or from the NDB facility in order to track to the beacon station. The Redbird NDB is approximately ten miles to the east of the airport and is maintained by the FAA.

The VOR, in general, provides azimuth readings to pilots of properly equipped aircraft by transmitting a radio signal at every degree to provide 360 individual navigational courses. Frequently, distance measuring equipment (DME) is combined with a VOR facility (VOR-DME) to provide distance as well as directional information to the pilot. Military tactical air navigation aids (TACANs) and civil VORs are commonly combined to form a VORTAC. The VORTAC provides distance and directional information to both civil and military pilots. The

Maverick VOR/DME is 17.3 nautical miles (nm) to the north at Dallas/Ft. Worth International Airport. The Ranger VORTAC is approximately 14 nm northwest of the airport. Each of these facilities are owned and maintained by the FAA. **Exhibit 1D** depicts these and other facilities.

GPS is an additional navigational aid for pilots. GPS was initially developed by the United States Department of Defense for military navigation around the world. GPS differs from an NDB or VOR in that pilots are not required to navigate using a specific facility. GPS uses satellites placed in orbit around the earth to transmit electronic radio signals which pilots or properly equipped aircraft use to determine altitude, speed, and other navigational information.

With GPS, pilots can directly navigate to any airport in the country and are not required to navigate using a specific navigation facility. The FAA is proceeding with a program to gradually replace all traditional enroute navigational aids with GPS over the next several years. The FAA phase-out schedule for traditional navigational aids is planned to occur by 2010. Most navigational aids supporting busier airports are planned to remain.

The ILS is an approach and landing aid designed to identify the exact alignment path of an aircraft. ILS systems are installed to allow approaches during periods of poor visibility. Arlington Municipal Airport plans to install one published ILS approach to Runway 34 within the next year. ILS systems provide three functions: 1) guidance, provided vertically by a glide slope beacon and horizontally by a localizer beacon; 2) range, furnished by marker beacons; and 3) visual alignment, supplied by the approach lighting system and runway edge lights.

AREA AIRSPACE

The Federal Aviation Administration Act of 1958 established the FAA as the responsible agency for the control and use of navigable airspace within the United States. The FAA has established the National Airspace System (NAS) to protect persons and property on the ground and to establish a safe environment for civil, commercial, and military aviation. The NAS is defined as the common network of U.S. airspace, including air navigational facilities; airports and landing areas; aeronautical charts; associated rules, regulations, and procedures; technical information; and personnel and material. System components shared jointly with the military are also included as part of this system.

To ensure a safe and efficient airspace environment for all aspects of aviation, the FAA has established an airspace structure that regulates and establishes procedures for aircraft using the National Airspace System. The U.S. airspace structure provides for categories or airspace, controlled and uncontrolled, and identifies them as Classes A, B, C, D, E, and G, as described below.

Class A airspace is controlled airspace and includes all airspace from 18,000

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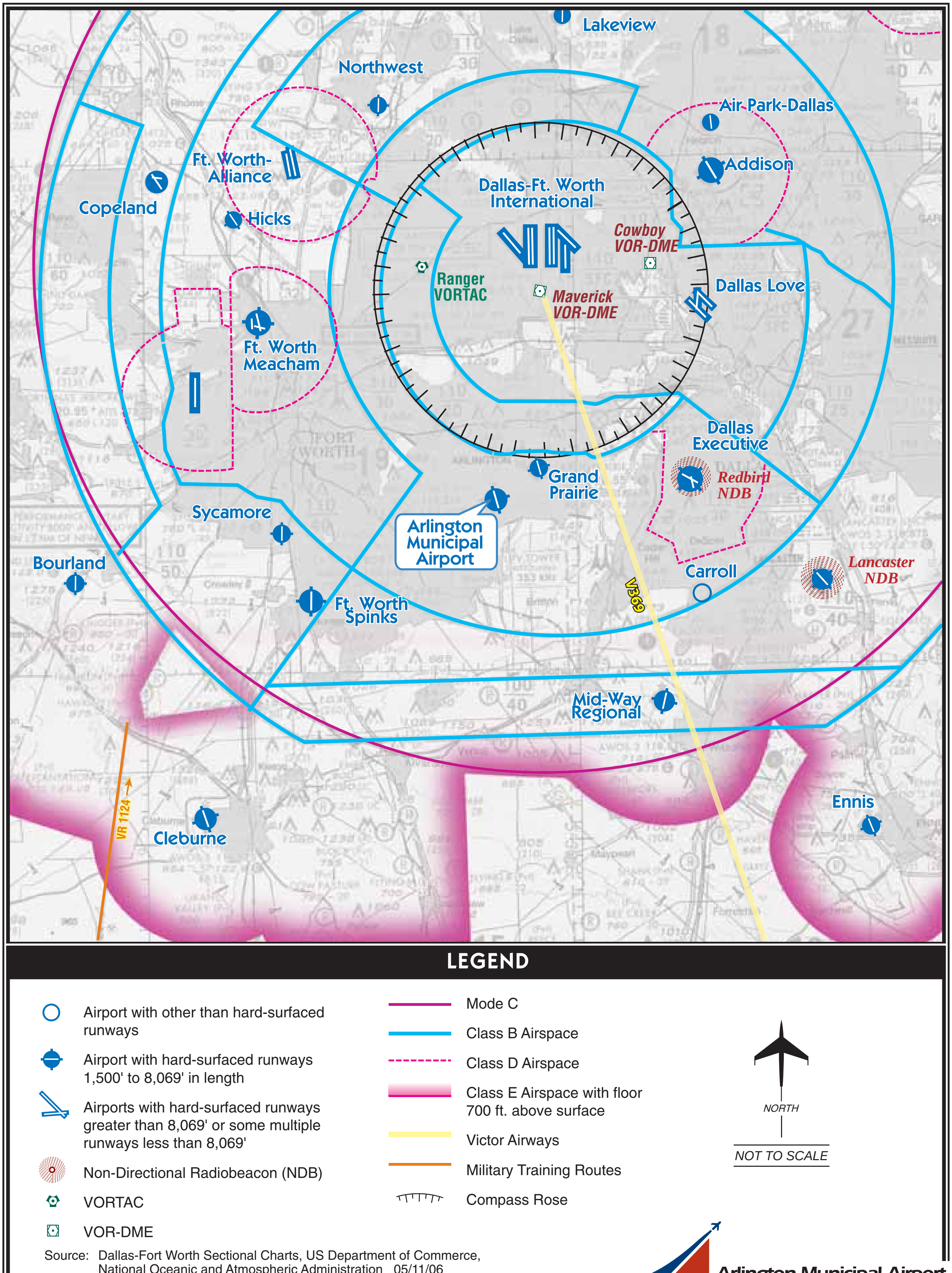

Arlington Municipal Airport

Exhibit 1D
VICINITY AIRSPACE

feet mean sea level (MSL) to Flight Level 600 (approximately 60,000 feet MSL). This airspace is designated in Federal Aviation Regulation (F.A.R.) Part 71.193, for positive control of aircraft. The Positive Control Area (PCA) allows flights governed only under IFR operations. The aircraft must have special radio and navigation equipment, and the pilot must obtain clearance from an air traffic control (ATC) facility to enter Class A airspace. In addition, the pilot must possess an instrument rating.

Class B airspace is controlled airspace surrounding high-activity commercial service airports (i.e., Dallas/Ft. Worth International Airport). Class B airspace is designed to regulate the flow of uncontrolled traffic, above, around, and below the arrival and departure airspace required for high performance, passenger-carrying aircraft at major airports. In order to fly within Class B airspace, an aircraft must be equipped with special radio and navigation equipment and must obtain clearance from air traffic control. A pilot is required to have at least a private pilot's certificate or be a student pilot who has met the requirements of F.A.R. Part 61.95, which requires special ground and flight training for Class B airspace. Aircraft are also required to utilize a Mode C transponder within a 30 nm range of the center of Class B airspace. A Mode C transponder allows the ATCT to track the location and altitude of the aircraft.

Class C airspace is controlled airspace surrounding lower-activity commercial service (i.e., Austin Bergstrom International Airport) and some military airports. The FAA has established Class C airspace at 120 airports around the country, as a means of regulating air traffic in these areas. Class C airspace is designed to regulate the flow of uncontrolled traffic above, around, and below the arrival and departure airspace required for high-performance, passenger-carrying aircraft at major airports. To operate inside Class C airspace, the aircraft must be equipped with a two-way radio, an encoding transponder, and the pilot must have established communication with the ATC.

Class D airspace is controlled airspace surrounding most airports with an operating ATCT and not classified under B or C airspace designations. The Class D airspace typically constitutes a cylinder with a horizontal radius of four or five nm from the airport, extending from the surface up to a designated vertical limit, typically set at approximately 2,500 feet above the airport elevation. If an airport has an instrument approach or departure, the Class D airspace sometimes extends along the approach or departure path.

All aircraft operating within Classes A, B, C, and D airspace must be in constant contact with the air traffic control facility responsible for that particular airspace sector.

Class E airspace is controlled airspace surrounding an airport that encompasses all instrument approach procedures and low-altitude federal airways. Only aircraft conducting instrument flights are required to be in contact with the appropriate air traffic control facility when operating in Class E airspace. While aircraft conducting visual flights in Class E airspace are not required to be in radio contact with air traffic control facilities, visual flight can only be conducted if minimum visibility and cloud ceilings exist.

Class G airspace is uncontrolled airspace, typically in overtop rural areas, that does not require communication with an air traffic control facility. **Exhibit 1E** generally illustrates each airspace type in three dimensional form.

Airspace within the vicinity of Arlington Municipal Airport is depicted on **Exhibit 1D**. Arlington Municipal Airport is located within transitional Class E airspace and lies underneath an inner ring of DFW Class B airspace. The inner ring of DFW Class B airspace immediately above Arlington Municipal Airport has a floor of 3,000 feet MSL and extends up to 11,000 feet MSL. To the north, as one nears DFW, the floor of DFW Class B airspace staggers downward, similar to an upside-down wedding cake. Just north of the Grand Prairie Municipal Airport, the Class B floor drops to 2,000 feet MSL. Approximately six miles to the north of Arlington Municipal Airport, the innermost ring of the DFW Class B airspace has a floor at ground level.

The airspace for a seven nm radius around Arlington Municipal Airport is transitional Class E airspace with a floor 700 feet above ground level (AGL), extending to 1,200 feet MSL. The Class E airspace surrounding the airport has been established to protect the instrument approaches to the airport. At a future point in time, the airspace surrounding Arlington Municipal Airport could become Class D airspace, however, this designation can only be made by the FAA.

VICTOR AIRWAYS

For aircraft enroute or departing to the south of the Metroplex using VOR navigational facilities, a system of federal airways, referred to as Victor Airways, has been established. Victor Airways are the "highways of the sky" and they extend between VOR facilities. They are eight miles wide and extend from 1,200 feet AGL to 18,000 feet AGL. Victor Airways serve primarily smaller piston-engine, propeller-driven airplanes on shorter routes. There is one Victor Airway within a short distance of Arlington Municipal Airport, located approximately five miles east, designated V369.

AIR TRAFFIC CONTROL

The Arlington Municipal Airport contract ATCT provides formal terminal air traffic control services. The control tower is attended 7:00 a.m. – 9:00 p.m. local time daily, year-round. As mentioned earlier, the ATCT opened for service on September 1, 2006.

Although automated terminal information service (ATIS) is not available, local weather-related information, including current wind and pressure settings, are provided on Arlington

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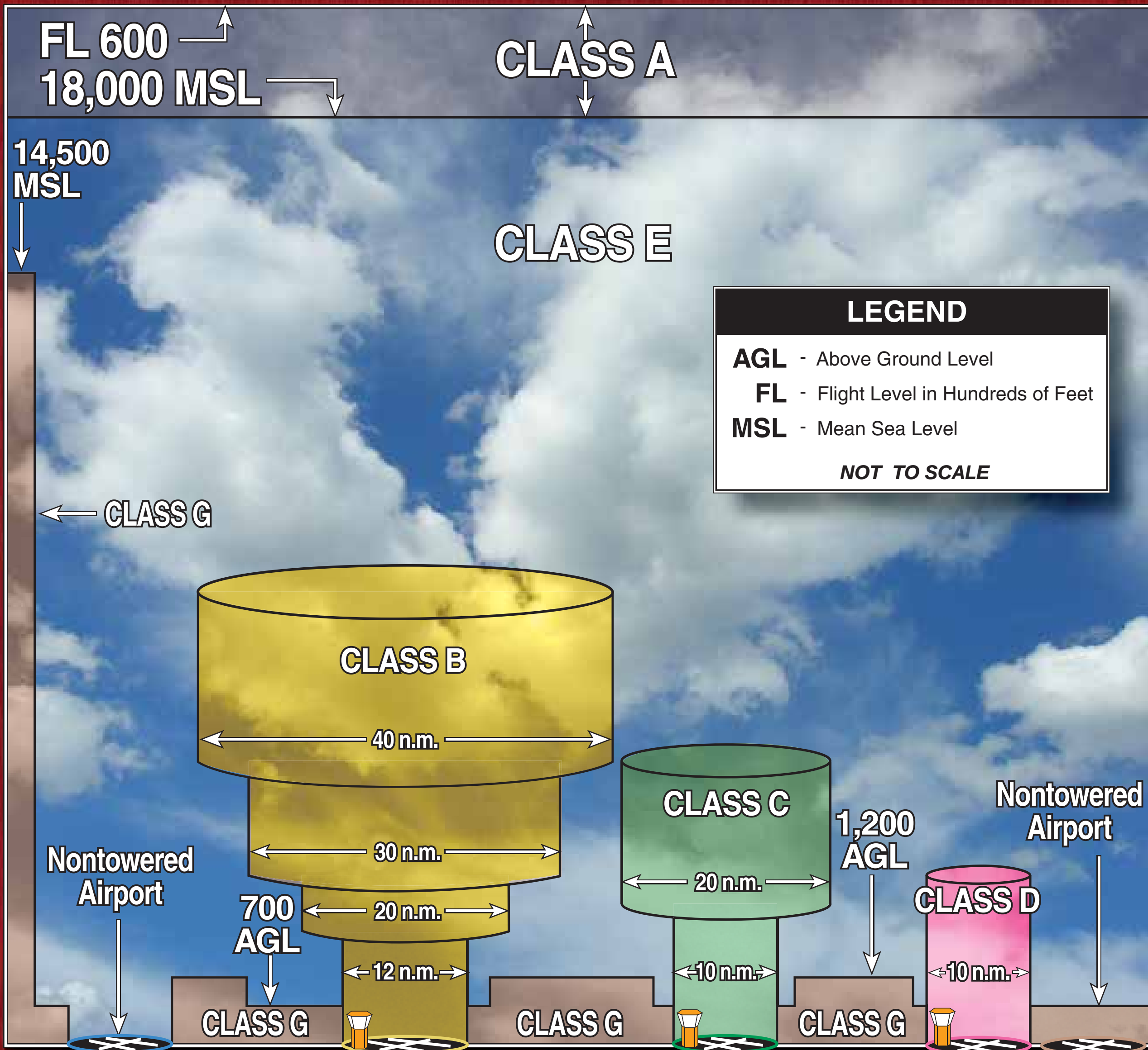

CLASSIFICATION	DEFINITION
CLASS A	Generally airspace above 18,000 feet MSL up to and including FL 600.
CLASS B	Generally multi-layered airspace from the surface up to 10,000 feet MSL surrounding the nation's busiest airports.
CLASS C	Generally airspace from the surface to 4,000 feet AGL surrounding towered airports with service by radar approach control.
CLASS D	Generally airspace from the surface to 2,500 feet AGL surrounding towered airports.
CLASS E	Generally controlled airspace that is not Class A, Class B, Class C, or Class D.
CLASS G	Generally uncontrolled airspace that is not Class A, Class B, Class C, Class D, or Class E.

Source: "Airspace Reclassification and Charting Changes for VFR Products," National Oceanic and Atmospheric Administration, National Ocean Service. Chart adapted by Coffman Associates from AOPA Pilot, January 1993.

ground control and tower frequencies 121.625 and 128.625, respectively. Weather information can also be obtained from the ASOS. Clearance delivery is provided on frequency 118.85.

When the tower is closed, the UNICOM frequency (123.075) is utilized for air traffic advisories and regional approach/departure control (135.975) is utilized for clearance delivery. By September 2007, it is expected that the UNICOM frequency will be phased out and the tower frequency will serve as the advisory frequency during hours in which the ATCT is closed. The FBO may be contacted on frequency 131.325 for fueling, car rental, and other services for pilots and passengers. For flight planning information, a weather briefing, and notices to airmen (NOTAM) information, the Fort Worth Flight Service Station (FSS) should be contacted by telephone at 1-800-WX-BRIEF. Enroute air traffic control services are provided by the Fort Worth Center, the Air Route Traffic Control Center (ARTCC), with jurisdiction over the enroute air traffic environment that transitions through Arlington Municipal Airport airspace.

INSTRUMENT APPROACH AND DEPARTURE PROCEDURES

When the visibility and cloud ceilings deteriorate to a point where visual flight can no longer be conducted safely, aircraft must follow published instrument approach procedures to locate and land at the airport. Also, aircraft operating under instrument flight rules (IFR) may be required to depart under a predetermined instrument departure route. These procedures are described below.

INSTRUMENT APPROACHES

There are currently two published instrument approach procedures to Arlington Municipal Airport: VOR/DME Runway 34 and RNAV (GPS) Runway 34.

The VOR/DME approach to Runway 34 at Arlington Municipal Airport allows pilots to land following a straight-in approach when cloud ceilings are reported at a minimum of 461 feet above the ground and visibility is not less than one mile for aircraft with approach speeds below 121 knots. For aircraft with approach speeds of 121 knots or greater, the cloud ceiling minimums remain unchanged (461 feet), but the visibility minimum increases to one and one-quarter mile. This approach procedure also provides for circling approaches to Runway 16. Circling approaches allow aircraft to initiate an approach to one end of the runway, then circle over to another runway end if weather conditions of the approach are met.

Runway 34 is also served by an RNAV (GPS) approach. Recent improvements to GPS approaches include localizer performance vertical guidance (LPV). LPV approaches couple the traditional lateral guidance with a vertical guidance component. The RNAV (GPS) approach to Runway 34 has been LPV approved.

As presented in **Table 1D**, the LPV RNAV Runway 34 approach allows for properly equipped aircraft and trained pilots to land when the visibility is at least one and one-quarter mile and the cloud ceilings are not lower than 338 feet AGL. The lateral navigation (LNAV) phase of the approach calls for straight-in minimums of at least one mile visibility and cloud ceilings greater than 421 feet AGL for aircraft with approach speeds less than 121 knots. For aircraft with approach speeds of 121 knots but less than 141 knots, cloud ceilings remain unchanged (421 feet), but the visibility increases to one and one-quarter mile. This approach procedure also provides for circling approaches to Runway 16.

TABLE 1D
Current Instrument Approach Data
Arlington Municipal Airport

	Weather Minimums by Aircraft Type					
	Category A		**Category B**		**Category C**	
	Cloud Height (feet AGL)	**Visibility (miles)**	**Cloud Height (feet AGL)**	**Visibility (miles)**	**Cloud Height (feet AGL)**	**Visibility (miles)**
VOR/DME Runway 34						
Straight-In	461	1	461	1	461	1.25
Circling	449	1	469	1	469	1.5
RNAV (GPS) Runway 34						
LPV DA	338	1.25	338	1.25	338	1.25
LNAV MDA	421	1	421	1	421	1.25
Circling	449	1.25	469	1.25	469	1.5

Source: FAA U.S. Terminal Procedures SC-2 August 2006

ARRIVAL AND DEPARTURE PROCEDURES

Due to the congested airspace over the Metroplex, the FAA has established a series of Standard Terminal Arrival (STAR) and Departure Procedures (DP). The STAR is a pre-planned air traffic control arrival procedure designed to provide for the transition from the enroute phase of flight to an outer fix or an instrument approach fix in the terminal area. The four published STARs are Dodje Three, Knead Five, Motza Six, and Sasie Two.

The DP is a pre-planned air traffic control departure procedure that provides for the transition from the terminal area to the enroute phase of the flight. The seven published DPs are Dallas Eight, Garland Two, Hubbard Five, Joe Pool Three, Kingdom Five, Texoma Nine, and Worth Five.

REGIONAL AIRPORTS

A review of public-use airports within a 20 nm radius of Arlington Municipal Airport was made to identify and distinguish the types of air services provided in the region. These airports were previously identified on **Exhibit 1D**. Information pertaining to each airport was obtained from FAA Form 5010, *Airport Master Record*.

It is important to consider the capabilities and limitations of other airports when planning for future changes or improvements at Arlington Municipal Airport. The following are those public-use airports with asphalt or concrete runways that can serve general aviation aircraft. These airports are listed by their proximity to Arlington Municipal Airport. DFW Airport is also discussed because of the impact it has on the operations at Arlington Municipal Airport. **Table 1E** identifies the major characteristics of each airport.

TABLE 1E
Public-Use Airports Near Arlington Municipal Airport
Arlington Municipal Airport Master Plan

Airport Name	Distance (nm)	Type	Longest Runway	Based Aircraft	Annual Operations	Services
Grand Prairie Municipal	3 NE	GA Reliever	4,001	287	98,000	Full GA
Dallas Executive	11E	GA Reliever	6,451	174	94,000	Full GA
Ft. Worth Spinks	12 SW	GA Reliever	6,002	157	55,000	Full GA
DFW International	14 N	Commercial	13,401	N/A	718,000	Commercial
Mid-Way Regional	15 SE	GA	5,000	100	35,000	Full GA
Dallas Love	16 NE	Commercial	8,800	598	235,000	Full GA / Comm.
Fort Worth Meacham	16 NW	GA Reliever	7,501	181	101,000	Full GA

Source: FAA Form 5010, *Airport Master Record*

Grand Prairie Municipal Airport is located three nm northeast of Arlington Municipal Airport. The airport, owned and operated by the City of Grand Prairie, is served with a concrete runway. Runway 17-35 is 4,001 feet long by 75 feet wide. The airport reports 287 based aircraft, including 17 multi-engine aircraft. Served by an air traffic control tower, the airport had 60,300 total aircraft operations in 2005. One FBO is located on the field and provides a variety of aviation services including full-service fuel, aircraft rental, aircraft parts, sightseeing/tours, and a pilot's lounge. The airport has two non-precision instrument approach procedures.

Dallas Executive Airport is located 11 nm east of Arlington Municipal Airport. Owned and operated by the City of Dallas, the airport is served by two paved runways. Runway 13-31 provides the greatest length, measuring 6,451 feet long by 150 feet wide. Runway 31 is served by an ILS precision approach. Crosswind Runway 17-35 is 3,801 feet long by 150 feet wide. Both runways are in good condition. There are 174 based aircraft, including 31 multi-engine and five jet aircraft. Served by an air traffic control tower, the airport reported 82,600 total aircraft operations in 2005. Services provided include full-service fuel, avionics, courtesy transportation, aviation accessories, and restrooms. There are six instrument approach procedures approved for use at the airport.

Fort Worth Spinks Airport, owned and operated by the City of Fort Worth, is located 12 nm southwest of Arlington Municipal Airport. It is served by Runway 17-35, which is 6,002 feet long by 100 feet wide and provides an asphalt surface. Runway 35 is served with an ILS precision approach. There are 157 based aircraft at the airport, including 15 multi-engine and two jet aircraft. Served by an air traffic control tower, the airport reported 55,200 total aircraft operations in 2005. One FBO on the airport provides a variety of services for aircraft, pilots, and passengers. There are three instrument approach procedures that serve the airport.

DFW International Airport is located 14 nm north of Arlington Municipal Airport. One of the largest and busiest airports in the world, DFW is classified as a large hub, commercial service airport. DFW is equipped with seven paved runways, with the longest runway being 13,400 feet long. DFW is served by two air traffic control towers and provides approach control services for the area. An array of instrument approach aids, including precision ILS approaches, aid pilots on approach during inclement weather conditions. DFW serves as an international airport and an airport of entry, providing customs services. This airport typically ranks as one of the busiest airports in the world in terms of enplanements (30 million) and operations (approximately one million). The airport also serves as a hub for UPS and other cargo carriers.

Mid-Way Regional Airport, located 15 nm southeast of Arlington Municipal Airport, is owned and operated by the cities of Midlothian and Waxahachie. It is served by an asphalt runway, Runway 18-36, that is 5,000 feet long by 75 feet wide. There are 100 based aircraft at the airport, including ten multi-engine and one jet aircraft. There are approximately 35,000 operations conducted annually. One FBO is located on the field that provides a variety of aviation-related services including full-service fuel, aircraft parking and tie-downs, flight training, and aircraft rental. There is one published non-precision instrument approach to the airport.

Dallas Love Field is located 16 nm northeast of Arlington Municipal Airport. It is a medium hub commercial service airport which had approximately 4.8 million enplanements in 2005. Love Field serves as the primary hub and corporate headquarters for Southwest Airlines. Owned and operated by the City of Dallas, the airport is served by three runways, with Runway 13R-31L the longest at 8,800 feet. Although it serves primarily as a commercial service airport, Love Field is also home to 598 aircraft, including 558 jets. Tower counts reflect approximately 235,000 annual operations. There are nine published instrument approaches, four of which are precision.

Fort Worth Meacham International Airport, located 16 nm northwest of Arlington Municipal Airport, is owned and operated by the City of Ft. Worth. It is equipped with three paved runways, the longest being Runway 16-34 at 7,501 feet long by 150 feet wide. There are 181 based aircraft at the airport, including 31 multi-engine and 75 jet aircraft. Served by an air traffic control tower, there were a total of 75,200 aircraft operations reported in 2005. Two of these instrument approaches are precision in nature. Four major FBOs provide a wide range of aviation services including full-service fuel, aircraft maintenance and avionics, flight training, aircraft rental, and pilots' lounge.

ENVIRONMENTAL INVENTORY

Available information about the existing environmental conditions at Arlington Municipal Airport has been derived from previous environmental studies, internet resources, agency maps, and existing literature. The intent of this task is to inventory potential environmental sensitivities that might affect future improvements at the airport. **Exhibit 1F** depicts many of the environmental resources located within the airport environs. These resources are discussed further within the following sections.

Fish, Wildlife, and Plants

The Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) are charged with overseeing the requirements contained within Section 7 of the *Endangered Species Act*. This Act was put into place to protect animal or plant species whose populations are threatened by human activities. Along with the FAA, the FWS and the NFMS review projects to determine if a significant impact to these protected species will result with implementation of a proposed project. Significant impacts occur when the proposed action could jeopardize the continued existence of a protected species, or would result in the destruction or adverse modification of federally designated critical habitat in the area.

In a similar manner, states are allowed to prepare statewide wildlife conservation plans through authorizations contained within the *Sikes Act*. Airport improvement projects should be checked for consistency with the State or DOD Wildlife Conservation Plans where such plans exist.

Table 1F depicts federal- and state-listed threatened and endangered species in Tarrant County. Each of the listed bird species require habitat which is found in areas containing water resources which are not prevalent within the airport environs. The gray and red wolf have been extirpated from the State of Texas and are, therefore, not likely to be found within the airport environs. Finally, the Texas horned lizard requires habitat with sparse vegetation and the timber/canebrake rattlesnake requires habitat in floodplain or woodland areas. Further coordination with the FWS and the TPWD is needed to determine the potential for the presence of any of these species within the project area.

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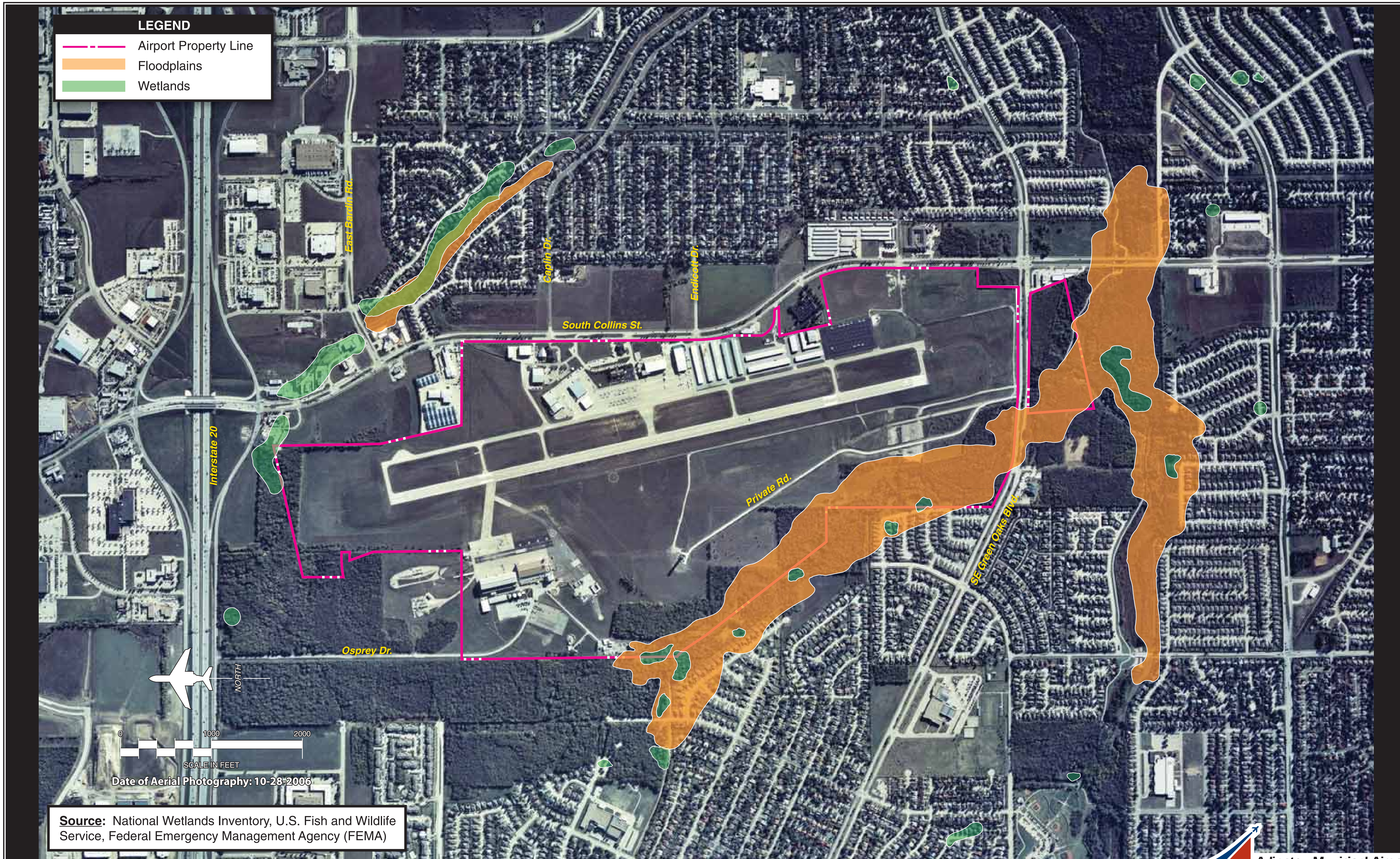

Source: National Wetlands Inventory, U.S. Fish and Wildlife Service, Federal Emergency Management Agency (FEMA)

Arlington Municipal Airport

Exhibit 1F
ENVIRONMENTAL SENSITIVITIES

TABLE 1F **Threatened, Endangered, or Sensitive Species**		
Common Name	**Federal Status**	**State Status**
Bald eagle	Threatened	Threatened
Artic Peregrine Falcon	None	Threatened
Interior Least Tern	Endangered	Endangered
Peregrine Falcon	None	Endangered
Whooping Crane	Endangered	Endangered
Gray Wolf	Endangered	Endangered
Red Wolf	Endangered	Endangered
Texas Horned Lizard	None	Threatened
Timber/Canebrake Rattlesnake	None	Threatened
Status: U.S. Fish and Wildlife Service, Tarrant County Species List, accessed December 2006 Texas Parks and Wildlife Department, Annotated County Lists of Rare Species, accessed December 2006		

Floodplains

Floodplains are defined in *Executive Order 11988, Floodplain Management*, as "the lowland and relatively flat areas adjoining inland and coastal waters…including at a minimum, that area subject to a one percent or greater chance of flooding in any given year" (i.e., that area would be inundated by a 100-year flood). Federal agencies, including the FAA, are directed to "reduce the risk of loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains." As depicted on **Exhibit 1F,** 100-year floodplains are present in the western and southern portions of airport property.

Wetlands/Waters of the U.S.

The U.S. Army Corps of Engineers regulates the discharge of dredged and/or fill material into waters of the United States, including adjacent wetlands, under Section 404 of the *Clean Water Act*. Wetlands are defined in *Executive Order 11990, Protection of Wetlands*, as "those areas that are inundated by surface or groundwater with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetation or aquatic life that requires saturated or seasonably saturated soil conditions for growth and reproduction." Categories of wetlands include swamps, marshes, bogs, sloughs, potholes, wet meadows, river overflows, mud flats, natural ponds, estuarine areas, tidal overflows, and shallow lakes and ponds with emergent vegetation. Wetlands exhibit three characteristics: hydrology, hydrophytes (plants able to tolerate various degrees of flooding or frequent saturation), and poorly drained soils.

According to the U.S. Fish and Wildlife Service's National Wetland Inventory Maps (NWI), a number of wetland areas are present within the airport environs (refer to **Exhibit 1F**). These wetlands are primarily located within the floodplain areas west and south of the airport as well as within the runway protection zone located north of the airport.

Historical, Architectural, and Cultural Resources

Determination of a project's impact to historical and cultural resources is made in compliance to with the *National Historic Preservation Act* (NHPA) *of 1966*, as amended for federal undertakings. Two state acts also require consideration of cultural resources. The NHPA requires that an initial review be made of an undertaking's *Area of Potential Effect* (APE) to determine if any properties in, or eligible for inclusion in, the National Register of Historic Places are present in the area.

According to the Texas Historical Commission's Texas Historic Sites Atlas, no known historical or cultural properties are located within the airport environs.

Department of Transportation Act: Section 4(f)

Section 4(f) properties include publicly owned land from a public park, recreational area, or wildlife and waterfowl refuge of national, state, or local significance; or any land from a historic site of national, state, or local significance. There are no Section 4(f) resources located on airport property. Parks and recreational areas, which could be deemed potential Section 4(f) resources, include Fish Creek Linear Park, which is maintained by the City of Arlington Parks and Recreation Department. This park is located south of the airport along Fish Creek.

SUMMARY

The information discussed in this chapter provides a foundation upon which the remaining elements of the planning process will be constructed. Information on current airport facilities and utilization will serve as a basis, with additional analysis and data collection, for the development of forecasts of aviation activity and facility requirement determinations.

The inventory of existing conditions is the first step in the complex process for determining those factors which will meet projected aviation demand in the community and region.

DOCUMENT SOURCES

A variety of different sources were utilized in the inventory process. The following listing reflects a partial compilation of these sources. This does not include data provided by airport management as part of their records, nor does it include airport drawings and photographs which were referenced for information. On-site inventory and interviews with staff and tenants contributed to the inventory effort.

Airport/Facility Directory, South Central U.S., U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office, September 28, 2006.

Dallas/Ft. Worth Sectional Aeronautical Chart, U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office, Sectional Chart, 76th edition, March 16, 2006.

U.S. Terminal Procedures, South Central U.S., U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office, September 28, 2006.

National Plan of Integrated Airport Systems (NPIAS), U.S. Department of Transportation, Federal Aviation Administration, 2005-2009.

2005 Facts and Figures. Prepared by the City of Arlington Department of Planning and Development Services.

1992 Comprehensive Plan. Prepared by the City of Arlington.

2000 Interstate 20 Business Area Plan. Prepared by the City of Arlington Department of Planning and Development Services.

Sector Planning. CD-ROM prepared by the City of Arlington Department of Planning and Development Services.

The Complete Economic and Demographic Data Source 2006 (CEDDS), Woods & Poole Economics, Inc., Washington, D.C.

A number of internet websites were also used to collect information for the inventory chapter. These include the following:

North Central Texas Council of Governments:
http://www.nctcog.dst.tx.us

FAA 5010 Data:
http://www.airnav.com
http://www.gcr1.com/5010Web

Texas Water Development Board:
http://www.twdb.state.tx.us/home/index.asp

Texas Workforce Commission
http://www.twc.state.tx.us

U.S. Census Bureau
http://www.census.gov

U.S. Bureau of Labor Statistics
http://www.bls.gov

City of Arlington
http://www.ci.arlington.tx.us

City of Arlington Chamber of Commerce
http://www.arlingtontx.com

Tarrant County
http://www.tarrantcounty.com/eGov/site/default.asp

Dallas County
http://www.dallascounty.org

Arlington Municipal Airport

Chapter Two

AVIATION DEMAND FORECASTS

Arlington Municipal Airport

AVIATION DEMAND FORECASTS

CHAPTER 2

A very important factor in facility planning involves a definition of demand that may reasonably be expected to occur during the useful life of the facility's key components. In airport master planning, this involves projecting potential aviation activity for a twenty-year timeframe. In fact, only two components of a master plan are actually approved by the Federal Aviation Administration (FAA), the forecasts and the airport layout plan (ALP) drawing set. The ALP set will be developed later in the study.

The FAA has oversight responsibility to review and approve aviation forecasts developed in conjunction with airport planning studies. The FAA reviews such forecasts with the objective of comparing them to its Terminal Area Forecasts (TAF) and the National Plan of Integrated Airport Systems (NPIAS). In addition, aviation activity forecasts are an important input to the benefit-cost analyses associated with airport development, and FAA reviews these analyses when federal funding requests are submitted.

As stated in FAA Order 5090.3C, *Field Formulation of the National Plan of Integrated Airport Systems* (NPIAS), dated December 4, 2004, forecasts should:

- Be realistic
- Be based on the latest available data
- Reflect current conditions at the airport
- Be supported by information in the study
- Provide adequate justification for airport planning and development

The forecast process for an airport master plan consists of a series of basic steps that can vary depending upon the issues to be addressed and the level of

effort required to develop the forecast. The steps include a review of previous forecasts, determination of data needs, identification of data sources, collection of data, selection of forecast methods, preparation of the forecasts, and evaluation and documentation of the results.

The following forecast analysis for Arlington Municipal Airport (GKY) was produced following these basic guidelines. Previous forecasts dating back to the previous master plan are examined and compared against current and historic activity. The historical aviation activity is then examined along with other factors and trends that can affect demand. The intent is to provide an updated set of aviation-demand projections for GKY that will permit the City of Arlington to make planning adjustments as necessary to maintain a viable, efficient, and cost-effective facility.

NATIONAL AVIATION TRENDS

Each year, the FAA publishes its national forecast. Included in this publication are forecasts for large air carriers, regional air carriers, general aviation, and FAA workload measures. The forecasts are prepared to meet budget and planning needs of the constituent units of the FAA and to provide information that can be used by state and local authorities, the aviation industry, and the general public. The current edition when this chapter was prepared was *FAA Aerospace Forecasts - Fiscal Years 2006-2017*, published in March 2006. The forecasts use the economic performance of the United States as an indicator of future aviation industry growth. Similar economic analyses are applied to the outlook for aviation growth in international markets.

In the seven years prior to 2001, the U.S. civil aviation industry experienced unprecedented growth in demand and profits. The impacts to the economy and the aviation industry from the events of 9/11 were immediate and significant. However, the economic climate and aviation industry are both on the recovery.

The Office of Management and Budget (OMB) expects the U.S. economy to continue to grow in terms of Gross Domestic Product (GDP) at an average annual rate of 3.1 percent over the next 12 years. This will positively influence the aviation industry, leading to passenger, air cargo, and general aviation growth throughout the forecast period (assuming there will be no new successful terrorists incidents against either U.S. or world aviation).

For the first time since 2000, the number of passenger enplanements on U.S. commercial airline carriers increased in 2004. This was due in large part to the extremely strong growth of low-cost carriers such as Southwest, AirTran Airways, and Jet Blue, among others. This trend continued in 2005 with a total of 523.1 million enplaned passengers, up 3.9 percent from 2004, but still 6.8 percent below the year 2000 peak. Over the forecast period, enplanements are expected to grow 3.1 percent annually, surpassing previous historic highs reached in 2000 within the next five years.

GENERAL AVIATION TRENDS

In the 12 years since the passage of the General Aviation Revitalization Act of 1994 (federal legislation which limits the liability on general aviation aircraft to 18 years from the date of manufacture), it is clear that the Act has successfully infused new life into the general aviation industry. This legislation sparked an interest to renew the manufacturing of general aviation aircraft due to the reduction in product liability, as well as renewed optimism for the industry.

After the passage of this legislation, annual shipments of new aircraft rose every year between 1994 and 2000. According to the General Aviation Manufacturers Association (GAMA), between 1994 and 2000, general aviation aircraft shipments increased at an average annual rate of more than 20 percent, increasing from 928 shipments in 1994, to 3,140 shipments in 2000. As shown in **Table 2A**, the growth in the general aviation industry slowed considerably after 2000, negatively impacted by the national economic recession and the events surrounding 9/11. In 2003, there were over 450 fewer aircraft shipments than in 2000, a decline of 14 percent.

TABLE 2A
Annual General Aviation Airplane Shipments
Manufactured Worldwide and Factory Net Billings

Year	Total	SEP	MEP	TP	J	Net Billings ($millions)
2000	3,140	1,862	103	415	760	13,497.0
2001	2,994	1,644	147	421	782	13,866.6
2002	2,687	1,601	130	280	676	11,823.1
2003	2,686	1,825	71	272	518	9,994.8
2004	2,963	1,999	52	321	591	11,903.8
2005	3,580	2,326	139	365	750	15,140.0

Source: GAMA
SEP – Single Engine Piston; MEP – Multi-Engine Piston; TP – Turboprop; J – Turbofan/Turbojet

In 2004, the general aviation production showed a significant increase, returning near pre-9/11 levels for most indicators. With the exception of multi-engine piston aircraft deliveries, deliveries of new aircraft in all categories increased. In 2005, total aircraft deliveries increased 17 percent. The largest increase was in single engine piston aircraft deliveries that increased 14 percent or by over 300 aircraft. Turbojet deliveries increased 21 percent, growing by more than 159 aircraft to 750 total aircraft. As evidenced in the table, new aircraft deliveries exceed pre-9/11 levels.

On July 21, 2004, the FAA published the final rule for sport aircraft: The *Certification of Aircraft and Airmen for the Operation of Light-Sport Aircraft* rules, which went into effect on September 1, 2004. This final rule establishes new light-sport aircraft categories and allows aircraft manufacturers to build and sell completed aircraft without obtaining type and production certificates. Instead, aircraft manufacturers will build to industry consensus standards. This reduces development costs and subsequent aircraft acquisition costs. This new category places specific conditions on the design of the aircraft, to limit them to "slow (less than 120 knots maximum) and simple" performance aircraft. New pilot training times are reduced and offer more flexibility in the type of aircraft the pilot would be allowed to operate.

Viewed by many within the general aviation industry as a revolutionary change in the regulation of recreational aircraft, this new rule is anticipated to significantly increase access to general aviation by reducing the time required to earn a pilot's license and the cost of owning and operating an aircraft. Since 2004, there have been over 30 new product offerings in the airplane category alone. These regulations are aimed primarily at the recreational aircraft owner/operator. By 2017, there are expected to be 14,000 of these aircraft in the national fleet.

While impacting aircraft production and delivery, the events of 9/11 and economic downturn have not had the same negative impact on the business/corporate side of general aviation. The increased security measures placed on commercial flights have increased interest in fractional and corporate aircraft ownership, as well as on-demand charter flights. According to GAMA, the total number of corporate operators increased by 148 between 2003 and 2005. Corporate operators are defined as those companies that have their own flight departments and utilize general aviation aircraft to enhance productivity. **Table 2B** summarizes the number of U.S. companies operating fixed-wing turbine aircraft since 1991.

TABLE 2B
U.S. Companies Operating Fixed-Wing Turbine Business Aircraft and Number of Aircraft, 1991-2003

Year	Number of Operators	Number of Aircraft
1991	6,584	9,504
1992	6,492	9,504
1993	6,747	9,594
1994	6,869	10,044
1995	7,126	10,321
1996	7,406	11,285
1997	7,805	11,774
1998	8,236	12,425
1999	8,778	13,148
2000	9,317	14,079
2001	9,709	14,837
2002	10,191	15,569
2003	10,661	15,870
2005	10,809	16,867

Source: GAMA/NBAA

The growth in corporate operators comes at a time when fractional aircraft programs are experiencing significant growth. Fractional ownership programs sell a share in an aircraft at a fixed cost. This cost, plus monthly maintenance fees, allows the shareholder a set number of hours of use per year and provides for the management and pilot services associated with the aircraft's operation. These programs guarantee the aircraft is available at any time, with short notice. Fractional ownership programs offer the shareholder a more efficient use of time (when compared with commercial air service) by providing faster point-to-point travel times and the ability to conduct business confidentially while flying. The lower initial startup costs (when compared with acquiring and establishing a flight department) and easier exiting options are also positive benefits.

Since beginning in 1986, fractional jet programs have flourished. **Table 2C** summarizes the growth in fractional shares since 1986. The number of aircraft in fractional jet programs has grown rapidly. In 2001, there were 696 aircraft in fractional jet programs. This grew to 776 aircraft in fractional jet programs at the end of 2002, and 826 in 2003. There were 949 aircraft at the end of 2005.

TABLE 2C
Fractional Shares and Number or Aircraft in Use

Year	Number of Shares	Number of Aircraft
1986	3	NA
1987	5	NA
1988	26	NA
1989	51	NA
1990	57	NA
1991	71	NA
1992	84	NA
1993	110	NA
1994	158	NA
1995	285	NA
1996	548	NA
1997	957	NA
1998	1,551	NA
1999	2,607	NA
2000	3,834	NA
2001	3,415	696
2002	4,098	776
2003	4,516	826
2004	4,765	865
2005	4,691	949

Source: GAMA

Very light jets (VLJs) are expected to enter the operational fleet in 2006. Also known as microjets, the VLJ is defined as a jet aircraft that weighs less than 10,000 pounds. There are several new aircraft under development, with the Eclipse 500, Cessna Mustang, and Adams 700 jet expected to enter service in 2006. These jets cost between $1 and $2 million, can takeoff on runways less than 3,000 feet, and cruise at 41,000 feet at speeds in excess of 300 knots. The VLJ is expected to redefine the business jet segment by expanding business jet flying and offering operational costs that can support on-demand air taxi point-to-point service. The FAA projects 100 VLJs in service in 2006. This category of aircraft is expected to expand at 400 to 500 aircraft per year, reaching nearly 5,000 aircraft by 2017.

In the seven years prior to the events of 9/11, the U.S. civil aviation industry experienced unprecedented growth in demand and profits. The impacts to the economy and aviation industry from the events of 9/11 were immediate and significant. However, the economic climate and aviation industry have been recovering in the past year. The FAA expects the U.S. economy to continue to expand through 2006 and 2007, and then continue to grow moderately (three percent annually) thereafter. This will positively influence the aviation industry, leading to passenger, air cargo, and general aviation growth throughout the forecast period (assuming that there will not be any new successful terrorist incidents against either U.S. or world aviation).

The FAA forecast assumes that the regulatory environment affecting general aviation will not change dramatically. The FAA recognizes that a major risk to continued economic growth is upward pressure on commodity prices, including the price of oil. However, the FAA economic models predict a 15 percent increase in oil prices in 2006, followed by a decline of 0.6 percent to 2.5 percent annually between 2007 and 2012, then rising by just over 2 percent annually for the balance of the forecast period.

The FAA projects the active general aviation aircraft fleet to increase at an average annual rate of 1.4 percent over the 12-year forecast period, increasing from 214,591 in 2005, to 252,775 in 2017. This growth is depicted on **Exhibit 2A**. FAA forecasts identify two general aviation economies that follow different market patterns. The turbojet fleet is expected to increase at an average annual rate of 4.0 percent, increasing from 16,658 in 2005, to 27,700 in 2017. Factors leading to this substantial growth include expected strong U.S. and global economic growth, the continued success of fractional-ownership programs, the introduction of the VLJ/microjet, and a continuation of the shift from commercial air travel to corporate/business air travel by business travelers and corporations. Piston-powered aircraft are projected to grow at 1.0 percent annually. Single engine piston aircraft are projected to grow at 0.3 percent annually, multi-engine piston at 1.0 percent annually, and 6.7 percent annually for piston-powered rotorcraft aircraft.

Aircraft utilization rates are projected to increase through the 12-year forecast period. The number of general aviation hours flown is projected to increase at 3.2 percent annually. Similar to active aircraft projections, there is projected disparity between piston and turbine aircraft hours flown. Hours flown by turbine aircraft are expected to increase at 6.4 percent annually compared with 1.8 percent for piston-powered aircraft. Jet aircraft hours are projected to increase at 10.2 percent annually over the next 12 years.

The total pilot population is projected to increase by 67,300 in the next 12 years, from an estimated 467,611 in 2005, to 535,000 by 2017, which represents an average annual growth rate of 1.1 percent. The student pilot population is forecast to increase at an annual rate of 1.7 percent over the 12-year forecast period, reaching a total of 106,164 in 2017. Growth rates for the other pilot categories over the forecast period are as follows: airline transport pilots, up 0.1 percent; recreational pilots declining 0.6 percent annually; rotorcraft only, up 3.7 percent annually; commercial pilots up 2.1 percent annually; private pilots down 0.2 percent annually; and glider only, up 0.4 percent. The decline in recreational and private pilots is the result of the expectation that most new general aviation pilots will choose to obtain the sport pilot license instead.

Over the past several years, the general aviation industry has launched a series of programs and initiatives whose main goals are to promote and assure future growth within the industry. The “No Plane, No Gain” is an advocacy program created in 1992 by the General Aviation Manufacturers Association (GAMA) and the National Business Aircraft Association (NBAA) to promote acceptance and increased use of general aviation as an essential, cost-effective tool for businesses. Other programs are intended to

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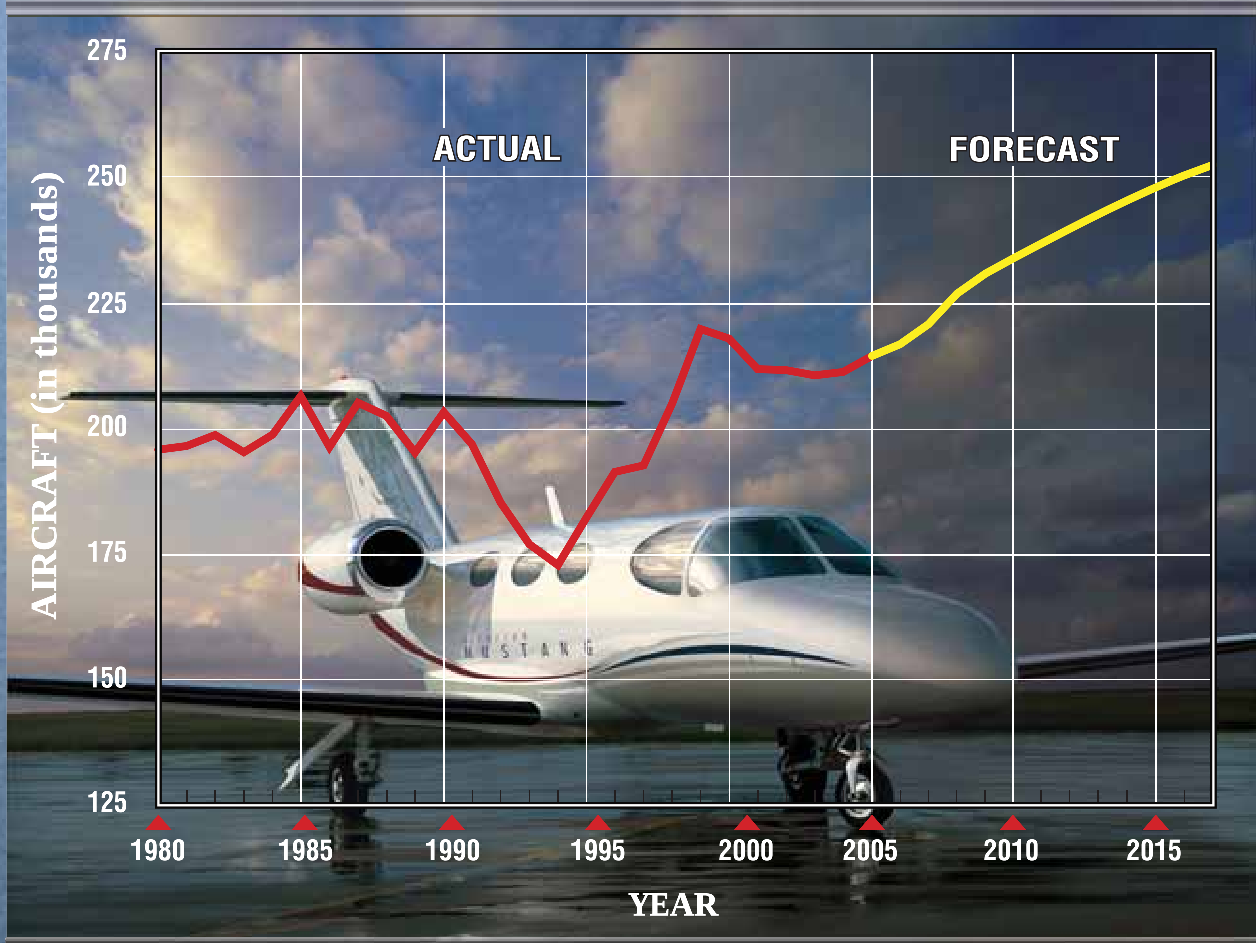
U.S. ACTIVE GENERAL AVIATION AIRCRAFT



U.S. ACTIVE GENERAL AVIATION AIRCRAFT (in thousands)

	FIXED WING									
	PISTON		TURBINE		ROTORCRAFT					
Year	Single Engine	Multi-Engine	Turboprop	Turbojet	Piston	Turbine	Experimental	Sport Aircraft	Other	Total
2005 (Est.)	144.5	17.5	8.0	8.6	2.8	4.8	22.3	N/A	6.0	214.6
2009	146.7	17.6	8.8	10.8	4.1	5.4	23.5	8.2	5.9	231.0
2013	148.4	17.6	9.6	14.0	5.2	6.0	24.6	11.6	5.8	242.8
2017	149.7	17.7	10.4	17.2	6.0	6.7	25.7	13.6	5.7	252.8

Source: FAA Aerospace Forecasts, Fiscal Years 2006-2017.

Notes: An active aircraft is one that has a current registration and was flown at least one hour during the calendar year.

Arlington Municipal Airport

Exhibit 2A
U.S. ACTIVE GENERAL AVIATION
AIRCRAFT FORECASTS

promote growth in new pilot starts and introduce people to general aviation. "Project Pilot," sponsored by the Aircraft Owners and Pilots Association (AOPA), promotes the training of new pilots in order to increase and maintain the size of the pilot population. The "Be a Pilot" program is jointly sponsored and supported by more than 100 industry organizations. The NBAA sponsors "AvKids," a program designed to educate elementary school students about the benefits of business aviation to the community and career opportunities available to them in business aviation. Over the years, programs such as these have played an important role in the success of general aviation and will continue to be vital to its growth in the future.

AVIATION TRENDS IMPACT ON ARLINGTON MUNICIPAL

Arlington Municipal Airport is a general aviation airport but is influenced by the national and regional commercial service trends. The events of September 11, 2001 caused significant passenger and financial losses for the airline industry; however, it created a significant growth segment in general aviation. These events spurred greater security measures which increased travel times for commercial passengers.

For business executives, time is a valuable asset which is even more costly than the price of an airline ticket. Many companies have turned to general aviation as an alternative measure for flying in order to recapture times savings. Moreover, the FAA forecasts indicate that the commercial airlines and the airports they serve are again becoming capacity constrained. These factors will likely influence an even greater demand for general aviation use, thus increasing demand at airports such as GKY.

General aviation is in a state of rapid flux. Corporate aircraft use has been bolstered by the emergence of fractional ownership programs and very light jets. Fractional ownership aircraft typically do not require full time space, such as hangar space, at an airport, but do require a highly functional passenger terminal building. Moreover, this too will be the case when VLJs used by programs such as DayJet become more common. Sport pilot rules make it easier and relatively less expensive to fly and should significantly increase the pool of aviators as a result.

Another issue which will influence change at Arlington is regional in nature. The airport supports operations tied directly to local businesses as diverse as General Motors (GM) to executives/owners of Major League Baseball (MLB). In the near future, the Dallas Cowboys will also call Arlington home. As such, the airport will be used by National Football League (NFL) executives/owners. While these types of demand may be more sporadic, they will generate a need for first class passenger transfer facilities, such as a terminal building. In many cases, the airport is the first thing a transient visitor will see of a community. The airport in effect is the doorstep to the community. Thus, it is very important that the airport and its facilities project a desired image to those using it.

Given this changing environment, it is imperative that airports such as Arlington Municipal be readied to meet the market demand. The airport has much to offer but also much potential. The analysis to follow will factor the emerging markets as well as normal growth. Analysis in the following chapters will factor the national and regional trends in order to position the City and airport to capture the demand.

SOCIOECONOMIC PROJECTIONS

The local socioeconomic conditions provide an important baseline for preparing aviation demand forecasts. Local socioeconomic variables such as population, employment, and income can be indicators for understanding the dynamics of the community and, in particular, the trends in aviation growth. The following is a summary of the research and projections presented in Chapter One. Information was obtained primarily from the City of Arlington and the North Central Texas Council of Governments (NCTCOG) for population and employment. Income information was obtained from the U. S. Census Bureau and Woods and Poole Economics.

POPULATION

Table 2D summarizes historical and forecast population estimates for Tarrant and Dallas Counties, as well as the City of Arlington. The State of Texas' projections are provided as a point of reference. Analysis of these areas which directly impact Arlington Municipal Airport will provide a more comprehensive understanding of the socioeconomic situations that affect the region which supports the airport. The analysis of historical population information for Tarrant County indicates an annual average growth rate (AAGR) of 2.41 percent between 1995 and 2005. Dallas County shows an AAGR of 1.27 percent over the same period. The City of Arlington grew at a 1.97 percent AAGR, while the State of Texas grew at a 1.89 percent AAGR.

Across the board, regional socioeconomic growth rates were significant for this time period. The greater Dallas area was one of the fastest growing metropolitan areas in the country. The Metroplex growth matched many metropolitan areas in the south, such as Atlanta and Phoenix. Many northern cities, however, showed much slower growth rates or even negative growth rates over the same period.

Future population data for Tarrant and Dallas Counties as well as the City of Arlington is presented in **Table 2D**. The population for Tarrant County is forecast to exceed 2.3 million by 2030. This projection equates to an annual growth rate of 1.34 percent between 2005 and 2030. The City of Arlington is also projected to continue to grow, but at a more moderate AAGR of 0.74 percent, increasing from 364,039 to 437,862. Dallas County population is projected to grow at an average annual rate of 0.80 percent, reaching 2,817,191 by 2030.

TABLE 2D
Socioeconomic Forecast Summary

	Historical			Forecast			Annual Growth Rate (AAGR)	
	1995	2000	2005	2010	2020	2030	1995 to 2005	2005 to 2030
City of Arlington								
Population	299,451	332,969	364,039	377,912	398,670	437,862	1.97%	0.74%
Employment	101,600	140,947	155,953	166,738	190,327	197,390	4.38%	0.95%
Tarrant County								
Population	1,294,453	1,446,219	1,642,950	1,746,082	2,047,553	2,291,723	2.41%	1.34%
Employment	679,728	864,360	985,109	1,077,319	1,265,489	1,388,247	3.78%	1.38%
PCPI	$23,362	$28,345	$27,804	$29,001	$31,694	$34,673	1.76%	0.89%
Dallas County								
Population	2,032,742	2,218,899	2,305,850	2,486,989	2,624,989	2,817,191	1.27%	0.80%
Employment	1,348,340	1,745,109	1,924,193	2,055,686	2,344,392	2,529,371	3.62%	1.10%
PCPI	$26,963	$33,720	$33,425	$35,248	$39,399	$44,155	2.17%	1.12%
State of Texas								
Population	18,958,751	20,851,820	22,859,970	24,651,570	28,137,890	31,905,360	1.89%	1.34%
Employment	9,015,240	9,960,436	10,629,606	14,195,200	16,720,510	19,244,420	1.66%	2.40%
PCPI	$21,455	$26,486	$26,256	$27,674	$30,875	$34,513	2.04%	1.10%

Source: Woods and Poole, CEDDS (2006); PCPI adjusted to $1996; Texas Workforce Commission - Historical Employment; NCTCOG - Population and Forecast Employment

EMPLOYMENT

Historical and forecast employment data for the region is also presented in **Table 2D**. The State of Texas is projected to experience an average annual employment growth rate of 2.40 percent from 2005 to 2030. This growth is significantly higher than the 1.66 percent experienced between 1995 and 2005.

Tarrant and Dallas Counties are projected to experience strong employment growth of an average annual rate of 1.38 percent and 1.10 percent respectively through 2030. The City of Arlington is projected to show continued positive employment growth at 0.95 percent annually through the planning period. The projected employment growth in and around Arlington bodes well for the economic well-being of the area.

PER CAPITA PERSONAL INCOME (PCPI)

Table 2D compares per capita personal income, adjusted to 1996 dollars, for selected areas of study. From 1995 to 2005, PCPI for Tarrant and Dallas Counties, as well as the State of Texas, showed substantial growth. Through 2030, Tarrant and Dallas Counties are projected to experience moderate gains in PCPI. Tarrant County's PCPI is projected to be similar to the State of Texas' PCPI throughout the planning period.

AIRPORT SERVICE AREA

The initial step in determining the general aviation demand for an airport is to define its generalized service area. The airport service area is determined primarily by evaluating the location of competing airports, their capabilities and services, and their relative attraction and convenience. Also, to aid in identifying the generalized service area for Arlington Municipal Airport, an analysis of the billing addresses for many of the based aircraft owners, specifically those which base in city hangars, was conducted.

The airport service area is a generalized geographical area where there is a potential market for airport services. Access to general aviation airports, commercial air service, and transportation networks enter into the equation to determine the size of a service area, as well as the quality of aviation facilities, distance, and other subjective criteria. Typically, the service area for a rural general aviation airport can extend up to 30 miles. Reliever general aviation airports, especially those in large urban settings, can expect a service area to be somewhat less sizable and even less definable.

The proximity and level of service offered by other airports are largely the defining factors when describing the airport service area. A description of nearby airports was previously completed in Chapter One. Arlington has several general aviation airports in close proximity that provide similar levels of service: Grand Prairie, Fort Worth Spinks, Dallas Executive, Mid-Way Regional, Fort Worth Meacham, and one commercial service airport with a large contingent of general aviation aircraft, Dallas Love Field.

Grand Prairie Municipal and Mid-Way Regional Airports both currently have shorter runways than Arlington Municipal Airport. Grand Prairie is somewhat restricted in future growth capabilities due to lack of available land on and around the airport for aviation use. Also, its 4,000-foot runway severely limits jet and larger multi-engine aircraft from utilizing the airport, especially in the summer months when the weather is warmer and more humid. The last development plan for Grand Prairie proposed a 600-foot runway extension, which even if completed, will still leave the airport incapable of fully accommodating most corporate aircraft.

Mid-Way Regional Airport currently provides a 5,000-foot runway. Within the year, the runway will be extended to 6,500 feet. While this length will be slightly more than that provided at Arlington, the airport's distant location will limit its potential to attract Metroplex demand. Mid-Way may be an attractive location to communities south and east of the Metroplex, but should not influence Arlington Municipal Airport demand.

Fort Worth Spinks, Dallas Executive, and Fort Worth Meacham Airports all have similar services to that of Arlington Municipal Airport. Each of these airports, however, do have limitations which will limit their influence on the Arlington service area.

Fort Worth Spinks is located approximately 12 miles southwest of GKY. It has an airport traffic control tower (ATCT) and full-service fixed base operator (FBO) amenities. Its main runway is 6,002 feet long and is served by an instrument landing system (ILS) precision approach. This airport is properly situated to attract aviation demand in Fort Worth, especially the southern and southwestern portions of the city. While Spinks may be an alternative to Arlington, its location limits its attractiveness for aviation demand desiring convenient access to the city of Arlington and the heart of the Metroplex. Moreover, Spinks has some landside constraints which will limit is ultimate landside development potential.

Dallas Executive is located 11 miles east of GKY. It has a longer runway, at 6,451 feet, three FBOs, a new airport terminal building, and new replacement ATCT. The south end of the primary runway is served with an ILS precision approach. Dallas Executive is positioned to serve the aviation demand of south central Dallas. While it has been historically underdeveloped, the City of Dallas has made a commitment to improve the facility as evidenced by the new terminal and ATCT. The primary drawback to this airport is its location and lack of immediately developable space. The terminal area is currently near build-out. The only remaining location for landside development is on the airport's west side. The City recently extended utilities to the west side in order to construct the ATCT; however, no new landside development has occurred outside of the ATCT. Executive will be a limiting factor on the GKY service area, but will primarily serve aviation demand only wishing convenient access to the City of Dallas.

Fort Worth Meacham is located 16 miles northwest of the airport and has a long runway at 7,501 feet, plus an ATCT, precision approach, and several FBO and specialty aviation facilities. Similar to Spinks and Dallas Executive, this airport is ideally situated to serve a specific aviation demand center, central and northern Fort Worth. Meacham is a very busy airport and has limitations for future developments due to lack of available land. Meacham too could limit the GKY service area, but not significantly.

Dallas Love Field is also attractive to general aviation users with its long runways and several FBOs on the field providing an array of general aviation services. A drawback to Dallas Love Field may be the regular mixing of large commercial aircraft with smaller general aviation aircraft. This situation is typically not desired by owners of smaller aircraft who would likely consider an airport such as Arlington. Love Field could compete with Arlington primarily for corporate traffic; however, congestion is also an issue with these operators.

As in any business enterprise, the more attractive the facility is in services and capabilities, the more competitive it will be in the market. As the level of attractiveness expands, so will the service area. If an airport's attractiveness increases in relation to nearby airports, so will the size of the service area. If facilities are adequate and rates and fees are competitive at Arlington Municipal Airport, some level of general aviation activity might be attracted to the airport from surrounding areas.

In determining the aviation demand for an airport, it is necessary to identify the role of that airport. The primary role of Arlington Municipal Airport is to serve the needs of general aviation operators in the region. General aviation is a term used to describe a diverse range of aviation activities which includes all segments of the aviation industry except commercial air carriers and the military. This includes recreational flying in single-engine aircraft, up to corporate business jets and even charter cargo operators.

In addition, Arlington Municipal Airport is a designated reliever airport. In this capacity, Arlington Municipal Airport should be maintained to accommodate all general aviation aircraft, such as business jets, to minimize congestion at commercial service airports. TxDOT also further identifies Arlington Municipal Airport as a Transport Airport. This designation makes the airport eligible for improvements to accommodate larger general aviation business jets.

Exhibit 2B depicts the location of the residences/businesses of many based aircraft owners. This data was derived from the analysis of the billing records of those aircraft owners that base at the airport in city-owned T-hangars and those based tenants that returned surveys who were not in city T-hangars. The largest concentration of based aircraft owners reside (home or business) within Arlington city limits and locate less than ten miles from Arlington Municipal Airport. There are also a significant number of based tenants that live approximately 20 miles from the airport, in the Fort Worth area.

When discussing an airport service area, two primary demand segments need to be addressed. The first component is the airport's ability to attract based aircraft. Almost universally, aircraft owners choose to base at an airport nearer their home or business. Convenience is the most common reason for basing in close proximity, as discussed below with aircraft survey responses. The second segment is transient aircraft operations. In most cases, transient aircraft operators will also elect to utilize airports nearer their intended destination. This, however, is highly dependent on the airport's capabilities to accommodate the aircraft operator. As a result, the more attractive the facility, the more likely an airport will be to attract a larger portion of the region's transient aircraft operations.

Given these considerations, the Arlington Municipal Airport service area will primarily center around the City of Arlington and eastern Tarrant County. As depicted on **Exhibit 2B**, this is the area most populated by based aircraft owners at GKY. What is also evident is that the airport has, and will likely continue to, attract aircraft owners and operators from more distant locales. Based on operational counts conducted by the airport and a private supplier of this type of data, the airport has also been very successful in attracting transient aircraft operations with destinations in the region. As a result, the primary service area for GKY will be the City of Arlington, eastern Tarrant County, and southwestern Dallas County. This represents a radius from the airport of ten miles.

Often, a general aviation airport may also have an identifiable secondary service area. Typically, this area would extend beyond the primary service area in order to fill in gaps of service be-

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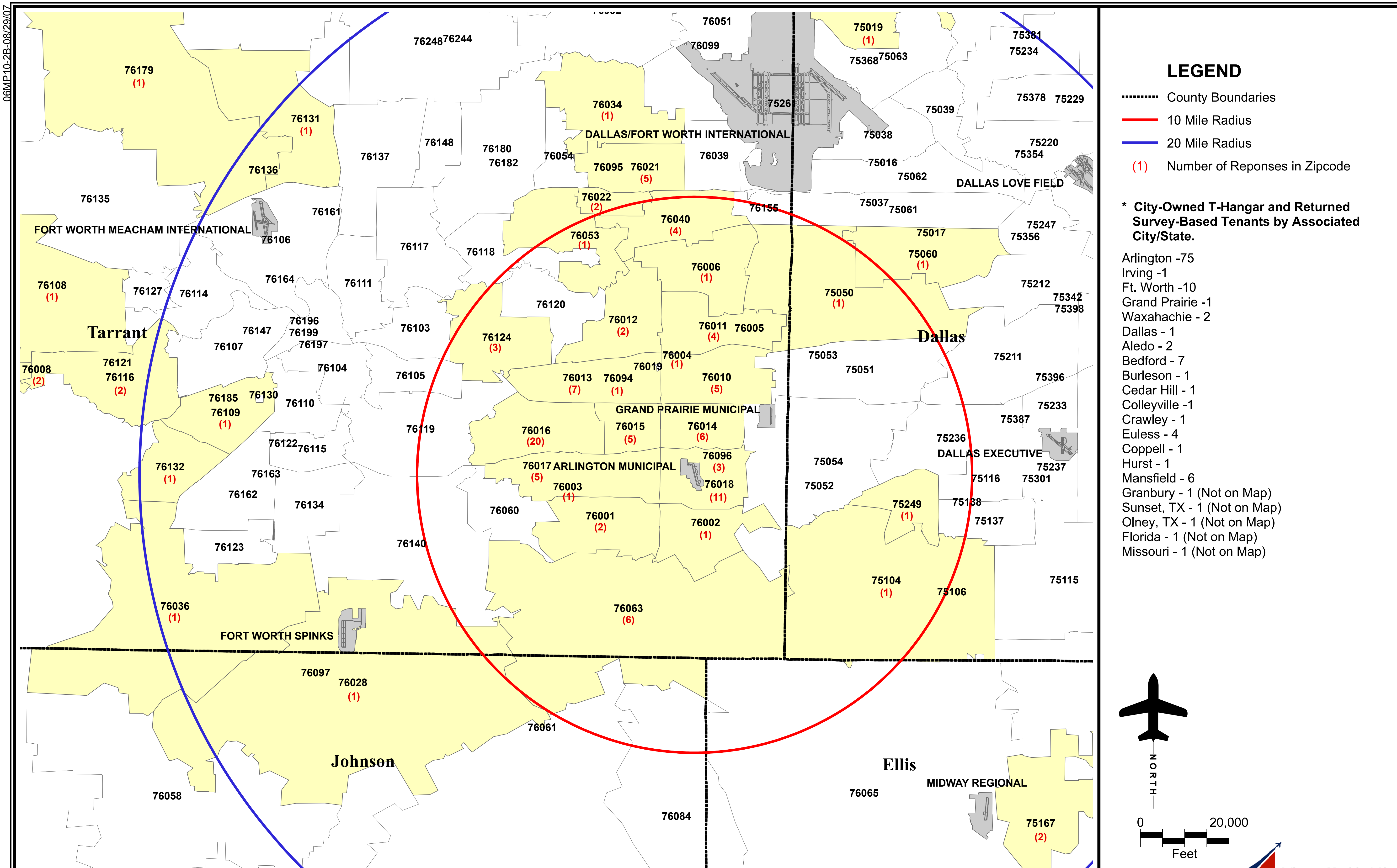


Arlington Municipal Airport
Exhibit 2B
SERVICE AREA MAP

tween airports. A secondary service area has been identified for Arlington Municipal Airport. This area essentially encompasses an area between ten and 20 miles away from the airport, in particular to the west. Aircraft owners in the secondary service area are typically closer to another airport, but due to a lack of facilities at those airports or more enticing facilities at Arlington, they may instead choose to base at Arlington Municipal Airport.

AIRPORT USER SURVEY

In order to obtain a profile of local general aviation users and their preferences, an airport user survey was conducted. The survey was sent to several registered aircraft owners living roughly within a 15-mile radius, as identified by FAA records. A total of 712 surveys were mailed, and due to limitations in the FAA aircraft owner database, 169 were returned undeliverable. As a result, of the 543 surveys delivered, 66 responses were submitted to the consultant (12.2 percent response rate). A total of 30 respondents indicated that they base 43 aircraft at Arlington Municipal Airport, as presented in **Table 2E**.

Seven of the 30 respondents that base at Arlington indicated they were contemplating the acquisition of at least one additional aircraft within the next five years. Responses indicated that each user conducts an average of 13 operations per month, with local training operations averaging 15 percent of those operations. The respondents indicated that they use their aircraft for recreation 82 percent of the time, for business 13 percent of the time, and for flight instruction five percent of the time.

The remaining questions on the survey were related to owner preferences. **Table 2E** presents the priority categories and respondent rankings. The priority weighting scale utilized number “1” as the highest priority and the number “7” as the lowest priority. It should be noted that several respondents simply checked a category or did not prioritize at all. Checked categories were given a priority of “1”, while unchecked categories were weighted with a “7”.

The majority of respondents indicated several preferences which led them to base at or has kept them at the airport. As indicated in the table, the highest priority for basing at the airport was for convenience (lived or worked closer to the airport). As noted earlier, this is the case with most airport-based aircraft operators at airports across the country. The next two highest priorities were the airport’s aircraft hangar facilities (3.5) and lower hangar storage fees (4.9). The lowest ranked categories were navigation aids (5.8) and amenities such as airport services, appearance, etc. (6.0).

The questionnaire also asked those surveyed what improvements they felt were necessary at Arlington Municipal Airport. This question asked for a priority ranking with “1” as the highest and “7" as the lowest. A clear majority felt that constructing new hangars and/or repairing existing hangars was the top priority. The need for better navigation aids was also a common response, with several indicating a need for a precision instrument approach. The airport is to install a precision instrument landing system (ILS) approach in the near future. Runways/taxiways and airport/FBO services were of the least concern to the based respondents.

TABLE 2E Pilot Survey Results Arlington Municipal Airport	
Total Survey Sent:	543
Total Survey Responses:	66
Response Rate:	12.2%
Respondents Based at Arlington:	30
Total Based Aircraft of Respondents:	43
Based Respondents Considering Another Aircraft in the Next Five Years:	7
Monthly Operations at Arlington by Based Respondents:	578
Average Operations for Each Based Aircraft per Month:	13
Percent "Touch-and-Go" Operations per Month:	15.2%
Primary Use of Aircraft (%)	
Business	13
Recreation	82
Flight Instruction	5
Other	0
Current Aircraft Storage	
Tie-down	3
T-hangar	23
Box Hangar	5
Conventional Hangar	3
Preferred Aircraft Storage	
Tie-down	0
T-hangar	19
Box Hangar	11
Conventional Hangar	1
Primary Reasons for Basing at Arlington*	
Convenience	1.5
Hangar Facilities	3.5
Hangar Costs	4.9
FBO/Terminal Services	5.7
Runway Length	5.0
Navigation Aids	5.8
Amenities	6.0
Other	6.6
Improvements Necessary at Arlington*	
Runway/Taxiway	6.0
Airport/FBO Services	6.0
Aircraft Apron	5.4
Hangar Repairs	3.3
Hangar Construction	2.9
Terminal Building	5.7
Navigation Aids	4.6
Other	5.9

* Survey results, averaged. 1=Highest Priority, 7=Lowest Priority
Source: Registered Pilot Surveys, Coffman Associates Analysis

The respondents were also asked to provide general comments. Several commented that they were happy to see an air traffic control tower (ATCT) constructed to help direct a busy aircraft traffic pattern on the airport. As mentioned earlier, there were a large number of respondents that would like to see more T-hangars built on the airport with improved services being provided in the T-hangar areas (i.e. public restrooms and electrical upgrades). Some indicated the need for self-service fuel, as they feel the airport is losing fuel sales to nearby airports with this capability. As of this printing, there is now self-serve fueling capability at the airport. Other common improvement suggestions included a restaurant, improved security measures such as video surveillance near hangars, and more aircraft maintenance facilities on the airport.

FORECASTING APPROACH

The development of aviation forecasts proceeds through both analytical and judgmental processes. A series of mathematical relationships is tested to establish statistical logic and rationale for projected growth. However, the judgment of the forecast analyst, based upon professional experience, knowledge of the aviation industry, and assessment of the local situation, is important in the final determination of the preferred forecast.

The most reliable approach to estimating aviation demand is through the utilization of more than one analytical technique. Methodologies frequently considered include trend line projections, correlation/regression analysis, and market share analysis.

Trend line projections are probably the simplest and most familiar of the forecasting techniques. By fitting growth curves to historical demand data, then extending them into the future, a basic trend line projection is produced. A basic assumption of this technique is that outside factors will continue to affect aviation demand in much the same manner as in the past. As broad as this assumption may be, the trend line projection does serve as a reliable benchmark for comparing other projections.

Correlation analysis provides a measure of direct relationship between two separate sets of historic data. Should there be a reasonable correlation between the data sets, further evaluation using regression analysis may be employed.

Regression analysis measures the statistical relationship between dependent and independent variables yielding a "correlation coefficient." The correlation coefficient (Pearson's "r") measures association between the changes in a dependent variable and independent variable(s). If the r-squared (r^2) value (coefficient determination) is greater than 0.90, it indicates good predictive reliability. A value below 0.90 may be used with the understanding that the predictive reliability is lower.

Market share analysis involves a historical review of airport activity as a percentage, or share, of a larger regional, state, or national aviation market. A historical market share trend is determined providing an expected market share for the future. These shares are then multiplied by the forecasts of the larger geographical area to produce a market share projection. This method has the same limitations as trend line projections, but can provide a useful check on the validity of other forecasting techniques.

It is important to note that one should not assume a high level of confidence in forecasts that extend beyond five years. Facility and financial planning usually require at least a ten-year view, since it often takes more than five years to complete a major facility development program. However, it is important to use forecasts which do not overestimate revenue-generating capabilities or understate demand for facilities needed to meet public (user) needs.

A wide range of factors is known to influence the aviation industry and can have significant impacts on the extent and nature of air service provided in both the local and national markets. Technological advances in aviation have historically altered, and will continue to change, the growth rates in aviation demand over time. The most obvious example is the impact of jet aircraft on the aviation industry, which resulted in a growth rate that far exceeded expectations. Such changes are difficult, if not impossible, to predict, and there is simply no mathematical way to estimate their impacts. Using a broad spectrum of local, regional, and national socioeconomic and aviation information, and analyzing the most current aviation trends, forecasts are presented in the following sections.

The following forecast analysis examines each of the aviation demand categories expected at Arlington Municipal Airport for the next 20 years. Each segment will be examined individually, and then collectively, to provide an understanding of the overall aviation activity at Arlington Municipal Airport through 2026.

GENERAL AVIATION FORECASTS

To determine the types and sizes of facilities that should be planned to accommodate general aviation activity, certain elements of this activity must be forecast. Indicators of general aviation demand include:

- Based Aircraft
- Based Aircraft Fleet Mix
- General Aviation Operations
- Peaking Operations
- Annual Instrument Approaches

The remainder of this chapter will examine historical trends and project future demand for these segments of general aviation activity at the airport.

BASED AIRCRAFT

The number of based aircraft is the most basic indicator of general aviation demand. By first developing a forecast of based aircraft, other demand elements can be projected based upon this trend. An effective method of forecasting based aircraft at an airport is to first examine aircraft ownership in an airport's service area. This is accomplished by analyzing the aircraft registrations in the region served by the airport. By then comparing the historic aircraft registrations to historic-based aircraft, a based aircraft forecast can be developed.

Registered Aircraft Forecasts

The primary service area for aircraft basing at Arlington Municipal Airport extends to include most of Tarrant County and the southwestern most portion of Dallas County. As such, a good comparison can be made for use in this analysis by considering the registered aircraft in Tarrant County. Aircraft ownership records for Tarrant County were obtained from the FAA aircraft registration database and are presented in **Table 2F**.

TABLE 2F
Historical Aircraft Registrations for Airport Service Area
Market Share of Competing Airports

		Aircraft Based at:							
Year	**Tarrant Registered Aircraft**	**Arlington**	**%**	**Grand Prairie**	**%**	**Meacham**	**%**	**Spinks**	**%**
1995	1,748	301	17.22%	287	16.42%	374	21.40%	87	4.98%
1996	1,752	305	17.41%	287	16.38%	374	21.35%	88	5.02%
1997	1,762	309	17.54%	287	16.29%	417	23.67%	90	5.11%
1998	1,808	304	16.81%	287	15.87%	417	23.06%	90	4.98%
1999	1,802	299	16.59%	287	15.93%	336	18.65%	90	4.99%
2000	1,922	304	15.82%	287	14.93%	336	17.48%	90	4.68%
2001	1,996	299	14.98%	287	14.38%	336	16.83%	163	8.17%
2002	2,001	303	15.14%	287	14.34%	219	10.94%	163	8.15%
2003	1,963	307	15.64%	287	14.62%	215	10.95%	165	8.41%
2004	1,943	310	15.95%	287	14.77%	219	11.27%	198	10.19%
2005	1,961	312	15.91%	290	14.79%	219	11.17%	200	10.20%
2006	1,971	302	15.32%	293	14.87%	217	11.01%	203	10.30%

Source: U.S. Census of Civil Aircraft; Airport records; FAA TAF

The table presents historical aircraft registrations for Tarrant County, between 1995 and 2006. The number of aircraft increased from 1995 to 2002, reaching a peak of 2,001 registrations, and then decreased slightly over the next two years. Over the past two years, however, the numbers have been increasing. This trend is very common for recessionary periods. Over the period, Tarrant County registered aircraft increased by 223.

Table 2F also shows the percentage of the registered aircraft that are based at nearby competing general aviation airports. Arlington has consistently accounted for approximately 15 to 17 percent of total registered aircraft in Tarrant County. Grand Prairie has also stayed relatively consistent throughout the period, decreasing slightly from 16.42 percent to 14.87 percent. Fort Worth Meacham and Ft. Worth Spinks, on the other hand, have showed significant variations. The number of aircraft based at Fort Worth Spinks has increased dramatically compared to the total number of registered aircraft, while just the opposite is true for Meacham.

Market Share of U.S. Fleet

The first registered aircraft forecast was developed by comparing the aircraft registered in Tarrant County with the active general aviation aircraft fleet in the United States. **Table 2G** provides historical and forecasted aircraft registrations since 1995.

TABLE 2G
Service Area Registered Aircraft Forecasts
Tarrant County

Year	U.S. Active Aircraft	Tarrant County Registered Aircraft	% of U.S. Aircraft
1995	188,089	1,748	0.9293%
1996	191,129	1,752	0.9167%
1997	192,414	1,762	0.9157%
1998	204,710	1,808	0.8832%
1999	219,464	1,802	0.8211%
2000	217,533	1,922	0.8835%
2001	211,447	1,996	0.9440%
2002	211,244	2,001	0.9472%
2003	209,606	1,963	0.9365%
2004	212,390	1,943	0.9148%
2005	214,591	1,961	0.9138%
2006	216,835	1,971	0.9090%
Constant Share Forecast			
2011	237,090	2,155	0.9090%
2016	250,435	2,276	0.9090%
2026	279,400	2,540	0.9090%
Increasing Share Forecast			
2011	237,090	2,181	0.9200%
2016	250,435	2,354	0.9400%
2026	279,400	2,738	0.9800%

Source: FAA *Aerospace Forecasts FY 2006-2017* (2026 extrapolated); U.S. Census of Civil Aircraft; Coffman Associates analysis

Two forecasts were developed considering the study area's share of U.S. active aircraft. First, a forecast maintaining a constant 0.9090 percent of U.S. active aircraft was developed. This forecast yields 2,540 registered aircraft by 2026. Next, an increasing share forecast was developed. As presented in the table, the increasing share forecast yields 2,738 aircraft by 2026. By 2016, aircraft registrations would be similar to the 2001 percentage share of U.S. active aircraft and then grow moderately through the long term period.

Market Share of Residents

Another method of forecasting study area aircraft registrations considers the number of aircraft per 1,000 residents in the study area. As mentioned earlier, the airport's service area is Tarrant

County and, thus, is being used for the population comparison. **Table 2H** presents historical and forecast registered aircraft per 1,000 residents of Tarrant County.

TABLE 2H
Tarrant County Registered Aircraft vs. Service Area Population

Year	Tarrant County Registered Aircraft	Tarrant County Population	Aircraft Per 1,000 Population
1995	1,748	1,294,453	1.35
2000	1,922	1,446,219	1.33
2005	1,961	1,642,950	1.19
2006	1,971	1,645,083	1.20
Decreasing Ratio Projection			
2011	2,098	1,777,600	1.18
2016	2,227	1,936,319	1.15
2026	2,448	2,205,832	1.11
Constant Ratio Projection			
2011	2,133	1,777,600	1.20
2016	2,324	1,936,319	1.20
2026	2,647	2,205,832	1.20
Increasing Ratio Projection			
2011	2,151	1,777,600	1.21
2016	2,382	1,936,319	1.23
2026	2,801	2,205,832	1.27

Source: U.S. Census of Civil Aircraft; NCTCOG; Coffman Associates analysis

Three forecasts were developed considering aircraft registrations per 1,000 residents. First, a decreasing ratio projection, following recent trends, yielded 2,448 aircraft by 2026. Next, a constant ratio of 1.20 aircraft per 1,000 residents yielded 2,647 aircraft by 2026. Finally, an increasing ratio projection reaching 1.27 aircraft per 1,000 residents yielded 2,801 aircraft registrations in Tarrant County by 2026. While the historical trend has been generally decreasing, it is more than likely a result of the economic recession. Thus, the decreasing projection is likely unreasonable. The increasing share would be the optimistic view while the constant share a reasonable projection.

Historical Growth Rate

Another method of projecting registered aircraft is to simply analyze the historical growth rate of the registered aircraft in the service area. The U.S. Census of Civil Aircraft reported 1,748 registered aircraft for Tarrant County in 1995 and 1,971 in 2006. This equates to an annual growth rate (AGR) of 1.10 percent. The forecast result is 2,082, 2,198, and 2,451 for the planning period.

As noted earlier, the period for which this forecast is being developed included a significant economic downturn. General aviation commonly responds in kind. For long range planning, the analysis should consider more realistic projections. Similar to the stock market, general aviation trends typically trend upward, and are temporarily impacted by recession. As a result, consideration should be given to the national growth projections.

The FAA projects active general aviation aircraft to increase by 1.4 percent between 2005 and 2017. It should be noted, however, that the overall percentage increase is tempered by a very small growth in single engine and multi-engine piston aircraft (less than one-half of one percent). Other aircraft segments are projected to grow by much more. Tarrant County can expect a higher share of cabin class aircraft than many other areas of the country given its strong socioeconomic base and projections. As a result, a higher annual average growth rate of 1.5 percent was considered for Arlington which yields 2,687 registered aircraft by 2026.

Statistical Trends and Regression

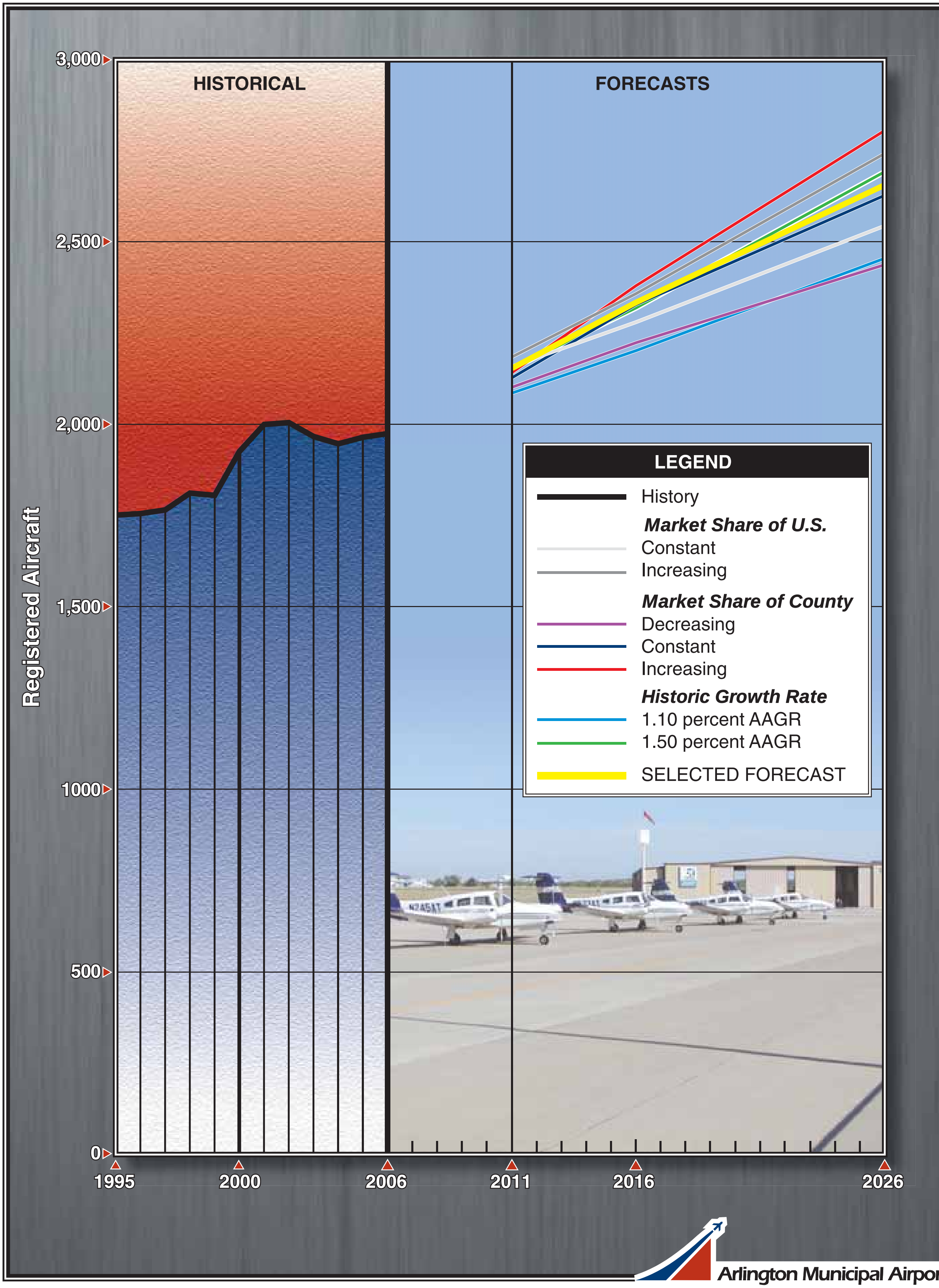
Regression analysis was also conducted as part of the registered aircraft forecast. These analyses utilized socioeconomic and national aviation variables to determine if there were any statistical correlations with historic regional aircraft trends. As mentioned earlier, a correlation coefficient greater than 0.90 yields good predictive reliability. The values from this study did not come near the 0.90 indicator and, thus, regression analysis was not used.

Registered Aircraft Summary

Table 2J summarizes the seven projections and presents the selected forecast for registered aircraft in the study area. Several forecasts appear reasonable while others may not be realistic. The high end of the planning envelope is defined by the increasing market share of county population which yields 2,801 aircraft by 2026. The low end is defined by the decreasing share of the same forecast method at 2,448 aircraft by 2026. The first five years of the planning period will likely experience moderate growth but the later years will likely have accelerated growth as the economy improves as forecasted. The selected forecast presented in the table takes these factors into consideration and provides a reasonable and slightly optimistic projection. The forecasts developed for the County's registered aircraft are also depicted on **Exhibit 2C**.

TABLE 2J
Registered Aircraft Projections Summary
Tarrant County, Texas

Projections	**2011**	**2016**	**2026**
Market Share of U.S. Active Aircraft Fleet			
Constant	2,155	2,276	2,540
Increasing	2,181	2,354	2,738
Market Share of County Registered Aircraft per 1,000 County Population			
Decreasing	2,098	2,227	2,448
Constant	2,133	2,324	2,647
Increasing	2,151	2,382	2,801
Annual Growth Rate			
1.10 percent AAGR	2,082	2,198	2,451
1.50 percent AAGR	2,149	2,315	2,687
Selected Forecast	***2,150***	***2,330***	***2,650***



Arlington Municipal Airport

Exhibit 2C
REGISTERED AIRCRAFT

Based Aircraft Forecasts

Determining the number of based aircraft at an airport can be a challenging task. With the transient nature of aircraft storage, it can be hard to arrive at an exact number of based aircraft, as the total can change rapidly, even weekly. As a result, airports often don't keep records of based aircraft. Fortunately, the airport staff at Arlington Municipal Airport has kept detailed records pertaining to tenants of city-owned and privately owned hangars. This data, in conjunction with the 1999 Master Plan update, has been used to arrive at the based aircraft data utilized in this analysis.

Market Share of Registered Aircraft

Now that registered aircraft for the service area has been forecast, based aircraft at Arlington Municipal Airport can be examined in comparison to historical regional registered aircraft. **Table 2K** presents based aircraft at Arlington Municipal Airport as a share of the study area's registered aircraft projection. As presented in the table, aircraft based at Arlington Municipal Airport as a share of the region's registered aircraft has decreased slightly since 1995.

TABLE 2K
Market Share of GKY Based Aircraft vs. Tarrant County Registered Aircraft
Arlington Municipal Airport

Year	Tarrant County Registered Aircraft	GKY Based Aircraft	% of Registered Aircraft
1995	1,748	301	17.22%
1996	1,752	305	17.41%
1997	1,762	309	17.54%
1998	1,808	304	16.81%
1999	1,802	299	16.59%
2000	1,922	304	15.82%
2001	1,996	299	14.98%
2002	2,001	303	15.14%
2003	1,963	307	15.64%
2004	1,943	310	15.95%
2005	1,961	312	15.91%
2006	1,971	301	15.32%
Constant Market Share Projection			
2011	2,150	329	15.32%
2016	2,330	357	15.32%
2026	2,650	406	15.32%
Increasing Market Share Projection			
2011	2,150	333	15.50%
2016	2,330	384	16.50%
2026	2,650	477	18.00%

Source: U.S. Census of Civil Aircraft; Airport records; Coffman Associates analysis

Future based aircraft at Arlington Municipal Airport will depend on several factors, including the economy, available airport facilities, and competing airports. Forecasts assume a reasonably stable and growing economy and reasonable development of airport facilities necessary to accommodate aviation demand. Competing airports will play a role in deciding regional demand shifts; however, Arlington will fare well in this competition.

Grand Prairie has significant constraints for future growth and is limited to primarily serve small aircraft. The Fort Worth general aviation airports have much more to offer and room for growth but they are too distant to serve the demand in eastern Tarrant County. Moreover, Arlington, in the immediate vicinity, is experiencing significant growth, most notably with the move of the Dallas Cowboys to Arlington and General Motors reemerging in the auto industry. Arlington's vital and dynamic economy, coupled with a strategic location in the heart of the Metroplex, will continue to make it an attractive destination for aircraft owners. Moreover, continued improvements at the airport, such as the ATCT and ILS installation, will also favorably factor in GKY's ability to attract additional based aircraft in the future.

Table 2K presents both a constant and increasing market share projection of GKY's based aircraft as compared with Tarrant County's registered aircraft. As presented in the table, the first based aircraft forecast considers that the airport would maintain a constant market share (15.32 percent) of the county's registered aircraft. This projection would yield 329 aircraft based at the airport in 2011, 357 aircraft in 2016, and 406 aircraft in 2026.

A second market share projection considers Arlington's potential to attract a greater share of regional aircraft in the future. This forecast considers an increasing market share reaching 18 percent, only slightly higher than the share captured by GKY in 1997. This projection would yield 333 aircraft based at the airport in 2011, 384 aircraft in 2016, and 477 aircraft by 2026.

Market Share per 1,000 Population

Trends comparing the number of based aircraft with the City of Arlington population were also analyzed. **Table 2L** presents the market share forecasts developed using the population of the City of Arlington. The constant share forecast results in 312, 320, and 346 based aircraft, while the increasing share forecast results in 323, 347, and 401 based aircraft for the planning periods.

Although the trend over the last 11 years has been generally decreasing, future trends may be reversed. Recent developments such as an ATCT, coupled with the addition of an ILS, will attract operators. The airport has not significantly increased hangar storage capacities over the period. If additional space is available for hangar development, large numbers of aircraft could elect to base at the airport. Socioeconomic conditions indicate continued strong growth. These factors coupled with changes in general aviation will likely reverse the historic trend within the planning period.

TABLE 2L
Based Aircraft vs. Arlington Population
Arlington Municipal Airport

Year	Based Aircraft	Arlington Population	Aircraft Per 1,000 Residents
1995	301	299,451	1.01
1996	305	305,873	1.00
1997	309	312,432	0.99
1998	304	319,133	0.95
1999	299	325,977	0.92
2000	304	332,969	0.91
2001	299	338,963	0.88
2002	303	345,065	0.88
2003	307	351,278	0.87
2004	310	357,602	0.87
2005	312	364,039	0.86
2006	301	366,772	0.82
Constant Ratio Projection			
2011	312	379,936	0.82
2016	320	390,232	0.82
2026	346	421,743	0.82
Increasing Ratio Projection			
2011	323	379,936	0.85
2016	347	390,232	0.89
2026	401	421,743	0.95

Source: NCTCOG; Airport records; Coffman Associates analysis

Comparative Forecasts

The FAA TAF also contains projections of based aircraft. For 2011, the TAF projects 330 based aircraft, increasing to 349 by 2016. The 2020 TAF projection is for 362 based aircraft. Because the TAF does not project beyond 2025, an extrapolation of the data was performed resulting in 382 based aircraft for 2026.

The 1999 Master Plan projected 339 based aircraft by 2010 and 364 by 2020. Interpolating the 1999 Master Plan, based aircraft projections yield 341 aircraft in 2011 and 354 aircraft in 2016. Extrapolation of the trend results in a forecast of 380 based aircraft for 2026.

Statistical Trends and Regression

Regression analysis was also conducted on the data sets. As discussed previously, it is optimal to have an "r^2" value near or above 0.90, which would represent a very strong correlation. The results of the regression analysis did not provide values near the 0.90 indicator. This can be directly attributed to the relatively stagnant nature of based aircraft in the early 2000s. As a result, this type of analysis was not used.

Based Aircraft Summary

Deciding which forecast or which combination of forecasts to use to arrive at a final based aircraft forecast involves more than just statistical analysis. Consideration must be given to the current and future aviation conditions at the airport in the short term. For example, it is known that Arlington currently has a large "waiting list" for hangar space on the airport. This list is updated on a regular basis and currently includes 64 aircraft owners. If the airport were to have more hangars constructed, it can be assumed that it would have little difficulty occupying the hangars, and thus increasing its based aircraft numbers.

Experience indicates that when new hangars are constructed, those who rent the space are not always new based aircraft. Some of them will be aircraft owners who have used tie-downs or other facilities at the airport. Typically, a new hangar facility will attract up to 75 percent new based aircraft. Also, approximately 50-75 percent of those on the waiting list will actually sign a lease when the opportunity becomes available. Because the airport management actively contacts all those on the list, it is fair to assume that upwards of 75 percent of those on the waiting list would sign a lease and base at Arlington Municipal Airport.

In addition, since the last master plan, Arlington Municipal Airport has improved in a manner to be more attractive to aircraft owners, especially corporate owners. A 1,080-foot runway extension has been added to accommodate larger jets and a newly constructed ATCT brings a dimension of safety to the airport traffic pattern. Existing navigational aids such as the Automated Surface Observation System (ASOS) are very much desired by aircraft owners, and a precision ILS approach to be installed in the near future will provide improved access to the airport during poor weather conditions.

The level of services, amenities, and airfield capabilities of other regional airports can also be a factor when projecting based aircraft. As previously mentioned, there are several airports within close proximity to Arlington Municipal Airport that provide full general aviation services. Grand Prairie, however, has a shorter runway length and will be limited as to the corporate jet traffic it can accommodate. Also, Grand Prairie has little room left for future development of its airport. Mid-Way Regional is too distant to accommodate Arlington's aviation demand. As a result, aircraft owners with larger aircraft would likely choose Arlington since it can better accommodate them.

Other airports in or in close proximity to the service area for Arlington Municipal Airport include Fort Worth Spinks and Meacham, Dallas Executive, and Dallas Love Field. Most smaller aircraft owners are likely to avoid the busy commercial service airports such as Dallas Love Field. The mixing of commercial jets and smaller general aviation aircraft is a condition that owners of smaller aircraft will typically avoid.

The Fort Worth airports and Dallas Executive Airport will probably be the most competitive to Arlington Municipal Airport. Fort Worth Meacham and Dallas Executive both have longer runways that are served by precision approaches, crosswind runways, and an ATCT located on the field. Fort Worth

Spinks has a runway similar in length to that at Arlington and is served by a precision ILS approach. An air traffic control tower is also present on the field. These three airports are all within approximately 15 miles of Arlington Municipal Airport. Due to the large number of aircraft owners and aviation activity in the area, they should all have the ability to provide general aviation services to their respective service areas, with some overlap.

The City of Arlington has made a concerted and successful effort to position the airport to accept significant growth. As a result, future based aircraft should trend toward the higher projections considered. Were the City to abandon the aggressive and positive growth goals for the airport, then the lower projections could be realized. The City has given every indication that it plans to continue strong support of its airport. **Table 2M** shows a summary of the six projections analyzed for future based aircraft at Arlington Municipal Airport. **Exhibit 2D** visually depicts the based aircraft projections, including the selected forecast.

TABLE 2M
Based Aircraft Projections Summary
Arlington Municipal Airport

PROJECTIONS	2011	2016	2026
Market Share of Tarrant County Registered Aircraft			
Constant	329	357	406
Increasing	333	384	477
GKY Based Aircraft per 1,000 Population (City of Arlington)			
Constant	312	320	346
Increasing	323	347	401
Comparative Forecasts			
FAA TAF	330	349	382*
1999 Master Plan	341*	354*	380*
SELECTED FORECAST	***330***	***360***	***410***

Source: Coffman Associates analysis; *Interpolated/extrapolated

Planning Horizons

The cost-effective, efficient, and orderly development of an airport should rely more upon actual demand at an airport than on a time-based forecast figure. In order to develop a master plan that is demand-based rather than time-based, a series of planning horizon milestones has been established for Arlington Municipal Airport that take into consideration the reasonable range of aviation demand projections prepared in this chapter.

It is important to consider that the actual activity at the airport may be higher or lower than projected activity levels. By planning according to activity milestones, the resulting plan can accommodate unexpected shifts, or changes, in the area's aviation demand. It is important that the plan accommodate these changes so that the airport

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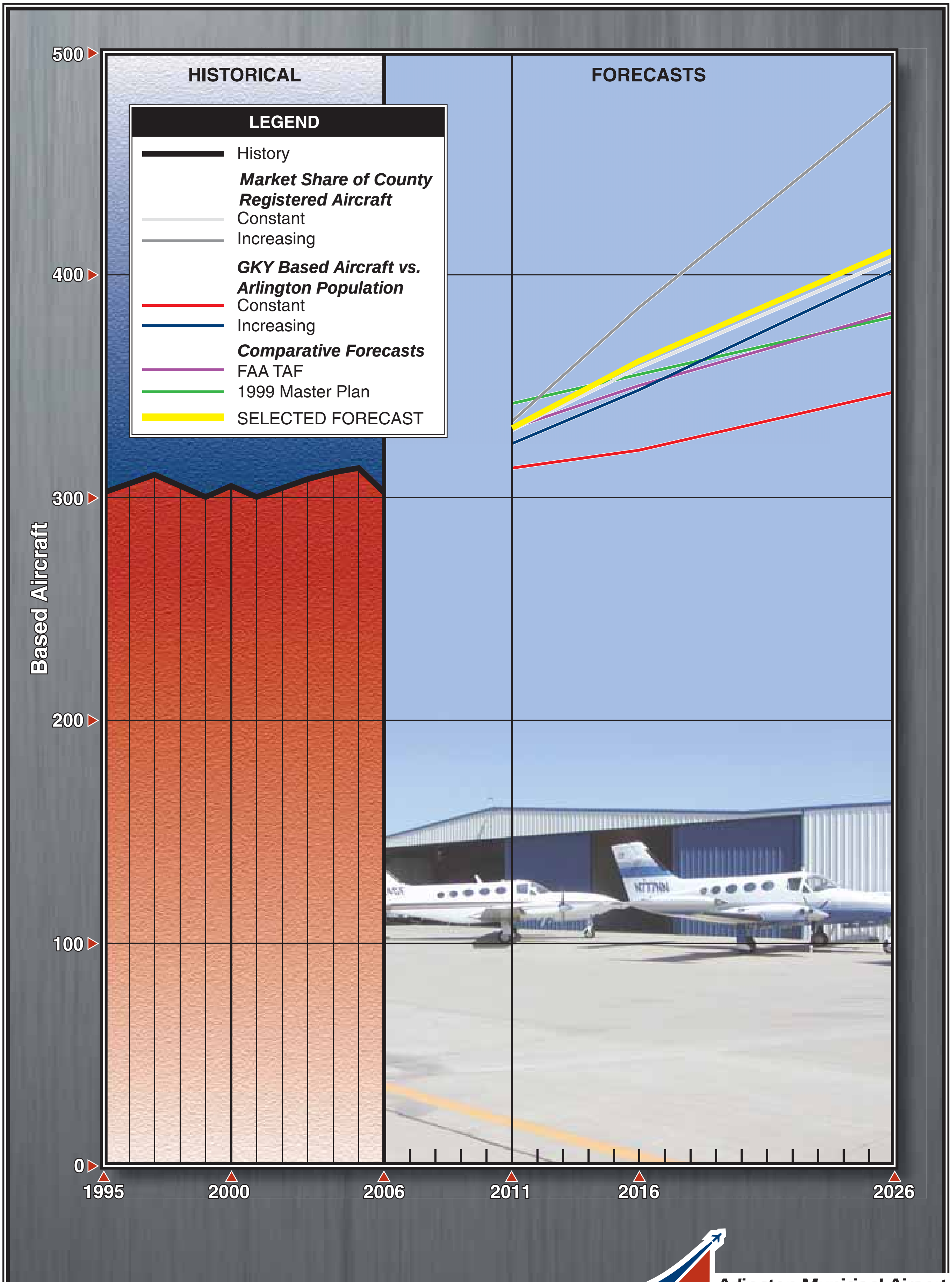


Arlington Municipal Airport

Exhibit 2D

BASED AIRCRAFT PROJECTIONS

staff can respond to unexpected changes in a timely fashion. These milestones provide flexibility, while potentially extending this plan's useful life if aviation trends slow over time.

The most important reason for utilizing milestones is that they allow the airport to develop facilities according to need generated by actual demand levels. The demand-based schedule provides flexibility in development, as development schedules can be slowed or expedited in response to actual demand at any given time over the planning period. The resulting plan provides airport officials with a financially-responsible, need-based program. The planning milestones of short, intermediate, and long-term generally correlate to the five, ten, and twenty-year periods used in the previous chapter. For based aircraft, the following planning milestones apply:

- Short Term - 330
- Intermediate Term - 360
- Long Term - 410

BASED AIRCRAFT FLEET MIX PROJECTION

Knowing the aircraft fleet mix expected to utilize the airport is necessary to properly plan facilities that will best serve the level of activity and the type of activities occurring at the airport. The existing based aircraft fleet mix is comprised of 209 single-engine, 57 multi-engine piston-powered aircraft, 12 turboprops, six jets, 15 helicopters, and two tilt-rotors.

As detailed previously, the national trend is toward a larger percentage of sophisticated turboprop, jet aircraft, and helicopters in the national fleet. Active multi-engine piston aircraft are expected to be the only category of aircraft which shows a decrease in annual growth. Growth within each based aircraft category at the airport has been determined by comparison with national projections (which reflect current aircraft production) and consideration of local economic conditions.

The projected trend of based aircraft at Arlington Municipal Airport includes a growing number of aircraft in each category, except multi-engine piston, which are projected to decline in both percentage mix and total numbers as well. Growth in turbojet aircraft is expected to be strong, as is growth in turboprop aircraft, following national trends. The based aircraft fleet mix projection for Arlington Municipal Airport is summarized in **Table 2N**.

Currently, single-engine aircraft compose the largest segment of aircraft type at Arlington Municipal Airport, making up 70 percent of total based aircraft. Future based aircraft mix will continue to be dominated by single-engine aircraft, however, turboprop and turbojet are projected to increase rapidly as a percentage of total aircraft. With the many recent improvements to the airport, as well as the projected growth in population and employment in the region, it is reasonable to expect more jets and other turbo-powered aircraft to base at Arlington Municipal Airport.

TABLE 2N Based Aircraft Fleet Mix Projections Arlington Municipal Airport								
	EXISTING		**FORECAST**					
Aircraft Type	**2006**	**%**	**Short Term**	**%**	**Inter. Term**	**%**	**Long Term**	**%**
Single-Engine	209	69.44%	230	69.70%	250	69.44%	272	66.34%
Multi-Engine	57	18.94%	56	16.97%	55	15.28%	54	13.17%
Turboprop	12	3.99%	15	4.55%	18	5.00%	31	7.56%
Jet	6	1.99%	10	3.03%	15	4.17%	28	6.83%
Helicopter	15	4.98%	17	5.15%	19	5.28%	22	5.37%
Tilt-Rotor	2	0.66%	2	0.61%	3	0.83%	3	0.73%
Totals	**301**	**100.00%**	**330**	**100%**	**360**	**100%**	**410**	**100%**
Source: Airport records; Coffman Associates analysis								

AIRCRAFT OPERATIONS

There are two basic types of operations at an airport: local and itinerant. A local operation is a takeoff or landing performed by an aircraft that operates within sight of the airport, or which executes simulated approaches and departures, or touch-and-go operations, at the airport. Generally, local operations are characterized by training operations. Itinerant operations are those performed by aircraft with a specific origin or destination away from the airport. These can be made by visitors to the airport or based aircraft operators.

Airport operations can be further broken down into distinct groups. For airports such as Arlington Municipal, operations typically include general aviation, air taxi, and military. General aviation operations are those conducted by private individuals or companies not flying commercially. Air taxi refers to those operators that are certified in accordance with Federal Aviation Regulation (F.A.R.) Part 135 and are authorized to provide, on demand, public transportation of persons and property by aircraft. Military operations are those conducted by military personnel and aircraft.

Arlington Municipal Airport does have an ATCT, but due to its short time in operation (since September 2006), only two months of actual logged aircraft operations are available for analysis. As of this writing, airport traffic records for September and October have been made available from ATCT personnel and indicate 10,033 and 10,801 operations, respectively. It should be noted that these actual counts do not include nighttime and very early morning operations when the ATCT is closed. Typically, five to ten percent more operations will occur at a reliever airport during the hours when the ATCT is closed.

For forecasting purposes, operational estimates were obtained from FAA Form 5010, FAA *Terminal Area Forecasts* (TAF), TxDOT's Airport Development Worksheet, and from interviews conducted with airport staff.

General Aviation Operations

One method of projecting annual operations is to examine the number of general operations per based aircraft. In attempts to quantify more reliably, rather than simply estimating, the Texas Department of Transportation-Aviation Division (TxDOT) established an operation monitoring system. The goal of this program was to ultimately establish a model that will provide more accurate counts.

TxDOT's methodology indicates that for airports similar to Arlington Municipal Airport (reliever), annual operations typically are on the order of 400-500 per based aircraft per year. Airports in major metropolitan areas with high numbers of based aircraft, flight schools, and with several fixed base operators, typically will experience the higher end of this range. As Arlington continues its development, it can be expected that the operational numbers will approach the 500 per based aircraft, and this is reflected in the forecast.

An airport such as Arlington will typically experience a 60/40 percent split between local and itinerant operations. Although some of the sources sited identify a 75/25 split, there is evidence that the trend at Arlington Municipal Airport is toward more itinerant operations. That evidence includes the fact that there are more transient aircraft (especially corporate jets) using the airport. **Table 2P** presents estimated historical and forecast operations for Arlington Municipal Airport.

TABLE 2P
General Aviation Operations Projections
Arlington Municipal Airport

Period	Based Aircraft	Itinerant Operations	Local Operations	Annual Operations	Operations per Based
2006	301	58,900	81,100	140,000	465
Forecast					
Short Term	330	64,500	89,000	153,500	465
Inter. Term	360	71,300	90,700	162,000	450
Long Term	410	80,150	94,100	174,250	425

Source: TxDOT Operations Model; FAA TAF

It should be noted that the FAA TAF identifies over 151,900 general aviation operations at the airport. The TxDOT development worksheet for the airport identifies approximately 133,900 general aviation operations. If the actual ATCT counts of September and October 2006 were simply projected as an average for the year, annual general aviation operations would total approximately 127,000. This figure, however, would be much lower than actual. In most cases, general aviation operations will be higher during the late spring and summer months. Many times, operations during these months will account for 10 to 13 percent of the annual figure. With this in mind, the two month count would likely result in an annual general operations figure of approximately 140,000.

The starting point of the forecast in this analysis considers a current level of 140,000 annual operations. This compromise has been arrived at due to consideration of the actual observed activity at the airport, pilot responses offered in the pilot survey, and the FAA TAF traditionally showing more based aircraft at the airport than actual numbers recorded by airport management.

The general aviation operational forecast considered extending the current 465 operations per based aircraft for the short term planning period. By the intermediate and long terms, however, the airport will become more congested and the operations per based aircraft should decrease slightly as presented in the table. Moreover, the forecast considers an increase in itinerant traffic as a percentage of total operations as the airport becomes more attractive to corporate aircraft operators.

Air Taxi Operations

As previously mentioned, air taxi refers to those operators that are certified in accordance with F.A.R. Part 135 and are authorized to provide, on demand, public transportation of persons and property by aircraft. Typically, air taxi operators are operating as a charter service or under a fractional-ownership program.

In the post-9/11 environment, many executives have opted to use private jets for their travel needs. Fractional-ownership programs were well positioned to meet this growing demand. There are a number of companies, including Citation Shares, NetJets, Bombardier FlexJet, and Flight Options, which provide this service. Companies or individuals are able to purchase partial ownership, typically one-sixteenth or one-eighth of an aircraft. This gives them a certain allotment of time to use an aircraft in the fractional-ownership fleet. In this regard, fractional ownership is much like owning a timeshare.

Analysis of air taxi operators can have a significant impact on the needs of an airport. Fractional-ownership companies utilize business jets almost exclusively. Many of these aircraft are the larger business jets. As more of the larger business jets utilize the airport, the necessary design standards for the airport may change. Charter operators use a variety of piston and turboprop and, on occasion, jet-powered aircraft. The type of aircraft using the airport will be a critical element for the airport to prepare for in the future.

As mentioned earlier, Arlington's ATCT has been in operation for a short period of time and precise operations counts are not available. Fortunately, a subscription service (*AirportIQ*) is available that provides partial operational data. The data provided represents the absolute minimum number of operations. If a flight plan is not opened prior to takeoff and/or is not closed after landing, then the operation is not credited to the airport, thus, not included in our data set. It is common for pilots to not file a flight plan until after departure, or to close it prior to landing, if visual flight rules (VFR) can apply. Also, air taxi estimates are provided in the TxDOT Airport Development Worksheet and FAA TAF.

The fractional ownership industry experienced significant growth from 1998 to 2002, when the aircraft fleet grew by 182 percent (*Aviation Week*). The economic slowdown of 2001-2002 caught up to the industry in 2003, but 2004 was another growth year. According to AvData, Inc., an independent, Wichita, Kansas-based aviation research and consulting firm, fractional ownership programs are forecast to experience continued growth of approximately 15 percent per year over the next 20 years. Other industry analysts are not as optimistic. J.P. Morgan analyst, Joseph Nadol, believes the immediate (next five years) growth potential is in the single digits (*Aviation Week*). For planning purposes, a moderately increasing trend of five percent per year will be applied to operations forecast for air taxi operations.

As presented in **Table 2Q**, charter operations accounted for approximately 3,800 operations from August 2005 to August 2006. By the long term planning period, 10,700 operations by charter operations are projected. In addition to charter operations, Arlington Municipal Airport also attracts fractional ownership programs. During the same one-year time period, there were approximately 1,000 fractional operations. Fractional operations are projected to increase from the current 1,000, to a long term of 2,700.

TABLE 2Q
Air Taxi Operations Forecast
Arlington Municipal Airport

Year	Charter Ops	Fractional Ops	Total Air Taxi Ops
Aug. 2005 - Aug. 2006	3,800	1,000	4,800
Forecast			
Short Term	5,200	1,300	6,500
Intermediate Term	6,500	1,700	8,200
Long Term	10,700	2,700	13,400

Source: TxDOT Development Worksheet; Airport IQ; Coffman Associates analysis

Military Operations

Military operations account for a small portion of operations at Arlington Municipal Airport. There are no based military aircraft at the airport, but there are a number of military aircraft which transition through the region and make stops for fuel or to visit Bell Helicopter. Because of the limited number of military operations from a historical perspective, a constant of 500 itinerant military operations will be included in the annual operations forecast.

Nighttime Operations

An input into the FAA's Integrated Noise Model (INM), which will be utilized later in the study, to output the airport's annualized noise contour is the amount and type of operations conducted between 10:00 p.m. and 7:00 a.m. During these times, ambient noise levels (e.g., traffic, industry, and other activities generate noise) are lower than during the day time. The ATCT at Arlington Municipal Airport is closed for this period. Moreover, no other true representation or count has been conducted to account for operations during this period.

Generally, nighttime operations at reliever general aviation airports can vary but are typically below ten percent of total itinerant operations. As can be expected, most pilot training, or touch-and-go operations, are done before 10:00 p.m. and after 7:00 a.m. Considering the type of aircraft activity at Arlington and its prime location in the Metroplex, it is assumed that itinerant operations at the airport will be on the high side of national averages. For this reason, a nighttime operations level of ten percent of the total itinerant operations will be added to the total annual operational figure.

Fleet Mix Operations

In order to discern the airport's fleet mix operations, interviews were conducted with airport officials, tower staff, fixed base operators, specialty operators, and fractional ownership operators. The airport administration maintains a log of all jet operations when time and staffing allows. Another data source, Airport IQ, provides data on all aircraft which filed and completed an instrument flight rule (IFR) flight into or out of Arlington Municipal Airport. It should be noted that the Airport IQ data does not catch every operation due to limitations in the software. This information coupled with the administration's count provides a very good understanding of the corporate fleet mix currently operating at the airport.

Future fleet mix operations were projected utilizing aircraft ownership trends, aircraft retirement possibilities, and aircraft operator inputs (including information obtained from the aircraft owner survey).

Based on operational estimates, just under 50 percent of itinerant airport operations were estimated to be made by single engine aircraft. Multi-engine piston aircraft were estimated to be 23 percent of itinerant traffic, while turboprop aircraft were estimated to be 12 percent of itinerant traffic. Jet operations were estimated to account for approximately five percent of total itinerant operations, equating to an average of approximately nine jet operations per day. Itinerant helicopter operations were estimated at ten percent of total current itinerant operations. **Table 2R** presents fleet mix estimates and projections for Arlington Municipal Airport.

Future itinerant operations are projected to include a large majority of single engine operations. Multi-engine piston aircraft operations were projected to decrease as a percentage; however, they were to remain relatively constant in number, increasing slightly. Turboprop and jet aircraft operations were projected to increase in percentage and number.

Current jet operations are dominated by the Cessna Citation and Lear aircraft families. This is not uncommon as these two aircraft families represent the largest percentage of business jets on the market today. This is expected to continue; however, other business jets such as the Boeing Business Jet (BBJ), Challenger 600, and Gulfstream family of aircraft are also expected to increase in percentage and number in the future.

TABLE 2R
Operational Fleet Mix Projection
Arlington Municipal Airport

	Current		**Short Term**		**Long Term**	
Aircraft Type	**Day**	**Night**	**Day**	**Night**	**Day**	**Night**
ITINERANT OPERATIONS						
Single Engine Piston Aircraft						
Light - Fixed Prop	15,750	1,575	16,500	1,650	20,200	2,020
Light - Variable Prop	15,750	1,575	16,500	1,650	20,200	2,020
Single Engine Subtotal	31,500	3,150	33,000	3,300	40,400	4,040
Twin Engine Piston and Turboprop Aircraft						
Beech Baron/Piper 31	15,000	1,500	15,800	1,594	18,100	1,804
King Air	8,000	800	10,010	1,000	15,200	1,520
Twin/Turbo Subtotal	23,000	2,300	25,810	2,594	33,300	3,324
Jet Aircraft						
Large Jet (<90,000 lbs)						
Boeing 727	20	2	40	4	60	6
DC-9	150	14	180	18	200	20
Gulfstream V	30	2	60	6	200	20
Boeing Business Jet	0	0	10	0	50	6
Medium Jets (30,000-90,000 lbs)						
Challenger 600/Falcon 2000	80	8	220	22	500	50
Gulfstream II/III	40	4	60	6	120	12
Gulfstream IV	60	6	200	20	320	32
Citation X/Falcon 50 & 900	120	12	200	20	500	50
Small Jets (>30,000 lbs)						
Citation I – VII	1,200	102	1,800	180	3,200	320
Falcon 10/20 & Beechjet	400	40	600	60	800	80
Lear 25	200	20	100	10	0	0
Lear 35-60 & Hawker 700/800	900	90	1,520	150	2,600	260
Jet Aircraft Subtotal	3,200	300	4,990	496	8,550	856
Helicopter						
Small (R-22 & H500)	3,500	350	3,900	380	5,400	540
Medium (Bell 206 & BO 105)	1,500	150	1,900	190	3,200	320
Large (Bell 222 & BK117)	1,500	150	1,900	190	3,200	320
Helicopter Subtotal	6,500	650	7,700	760	11,800	1,180
Total Itinerant	64,200	6,400	71,500	7,150	94,050	9,400
LOCAL OPERATIONS						
Aircraft Type	**Day**	**Night**	**Day**	**Night**	**Day**	**Night**
Light – Fixed	36,000	0	41,000	0	43,000	0
Light – Variable	36,000	0	38,100	0	39,500	0
Beech Baron	5,000	0	5,500	0	6,500	0
Small (R-22 & H500)	4,100	0	4,400	0	5,100	0
Total Local Operations	81,100	0	89,000	0	94,100	0
Total Annual Operations	***145,300***	***6,400***	***160,500***	***7,150***	***188,150***	***9,400***

It should be noted that the airport is currently utilized by large cargo aircraft. The Boeing 727 and McDonald Douglas DC-9 aircraft are utilized by specialty cargo operators to move freight for local businesses. These operations are common for locales having factories which may need quick delivery of essential parts. This type of operation is forecast to remain relatively constant through the planning period. The B-727 and DC-9 aircraft are relatively aged and may be replaced by similar aircraft types in the future. Thus, the forecast simply represents that cargo operations by large jet aircraft will continue through the planning period.

PEAKING CHARACTERISTICS

Many airport facility needs are related to the levels of activity during peak periods (busy times). The periods used in developing facility requirements for this study are as follows:

- **Peak Month -** The calendar month when peak aircraft operations occur.
- **Design Day -** The average day in the peak month. This indicator is derived by dividing the peak month operations by the number of days in the month.
- **Busy Day -** The busy day of a typical week in the peak month.
- **Design Hour -** The peak hour within the design day.

The peak month is an absolute peak within a given year. All other peak periods will be exceeded at various times during the year. However, they do represent reasonable planning standards that can be applied without overbuilding or being too restrictive. Information related to peak operational activity is not available due to the short period of time the air traffic control tower has been in operation. Therefore, peak period forecasts have been determined according to trends experienced at similar airports.

Typically, the peak month for activity at general aviation airports approximates 10 to 15 percent of the airport's annual operations. The lower end of the standard is typical of good weather locales and for airports without extraordinary circumstances. For planning purposes, peak month operations have been estimated as 10 percent of annual operations at Arlington Municipal Airport. The design day operations were calculated by dividing the peak month by 31. The design day is primarily used in airfield capacity calculations.

The busy day provides information for use in determining aircraft parking apron requirements. The busiest day of each week accounts for approximately 20 percent of weekly operations. Thus, to determine the typical busy day, the design day is multiplied by 1.4, which represents 20 percent of the days in a week (7 x 0.2). Design hour operations were determined at 13 percent of the design day operations, then decreasing over the period as operations become more evenly spread throughout the day. These figures are typical of very active reliever general aviation airport across the country. Annual operations peaking characteristics are summarized in **Table 2S**. Annual operations include all operations, including nighttime operations, as presented in earlier sections.

TABLE 2S
Peak Operations Forecasts
Arlington Municipal Airport

	Current	Short Term	Intermediate Term	Long Term
Annual Operations Peak	151,700	167,650	178,700	197,550
Peak Month (10%)	15,170	16,765	17,870	19,755
Busy Day	685	757	807	892
Design Day	489	541	576	637
Design Hour	64	68	69	70

Source: Coffman Associates analysis

ANNUAL INSTRUMENT APPROACHES (AIAs)

An instrument approach, as defined by the FAA, is "an approach to an airport with the intent to land by an aircraft in accordance with an instrument flight rule (IFR) flight plan, when visibility is less than three miles and/or when the ceiling is at or below the minimum initial approach altitude." To qualify as an instrument approach at Arlington Municipal Airport, aircraft must land at the airport after following one of the published instrument approach procedures and then properly close their flight plan on the ground. The approach must be conducted in weather conditions which necessitate the use of the instrument approach. If the flight plan is closed prior to landing, then the AIA is not counted in the statistics. Forecasts of annual instrument approaches (AIAs) provide guidance in determining an airport's requirements for navigational aid facilities. It should be noted that practice or training approaches do not count as annual AIAs.

Typically, AIAs for airports with available instrument approaches utilized by advanced aircraft will average between one and two percent of itinerant operations. Two percent has been an accepted industry standard for general aviation airports that currently, or are expected to, support corporate jet aircraft, which is the case for Arlington Municipal Airport. Also, the increased availability of low-cost navigational equipment could allow for smaller and less sophisticated aircraft to utilize instrument approaches. National trends indicate an increasing percentage of annual approaches given the greater availability of approaches at airports with GPS and the availability of more cost-effective equipment. **Table 2T** summarizes both historical and forecast AIAs for the planning period.

According to the FAA Air Traffic Activity statistics, Arlington Municipal Airport had 184 AIAs in 2004. This is the absolute minimum number of AIAs conducted at the airport. As previously mentioned, to be counted as an AIA, a flight plan cannot be closed prior to landing, but this practice is common if the airport comes within visual range. Tracking of AIAs should become more accurate with the recent opening of the Arlington ATCT, allowing pilots to communicate with tower personnel. The forecast presented in **Table 2T** utilized an industry standard of one percent of itinerant operations to account for AIAs. It should be noted that all the nighttime operations estimated are included with air taxi, general aviation, and military operations to arrive at total itinerant operations.

TABLE 2T
Annual Instrument Approach (AIA) Projections
Arlington Municipal Airport

Year	AIAs	Itinerant Operations	Ratio
1999	386	59,200	0.65%
2000	278	59,800	0.46%
2001	350	61,612	0.57%
2002	405	62,086	0.65%
2003	279	62,558	0.45%
2004	184	63,033	0.29%
Forecasts			
Short Term	790	78,650	1.00%
Inter. Term	880	88,000	1.00%
Long Term	1,035	103,450	1.00%

Source: FAA TAF - Approach Operations

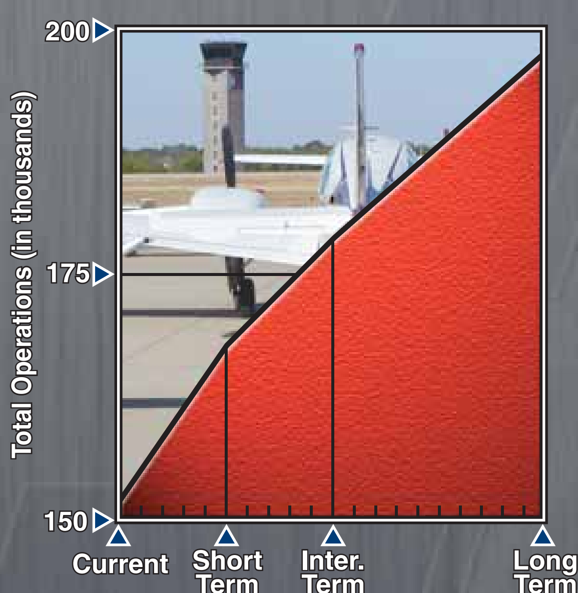
SUMMARY

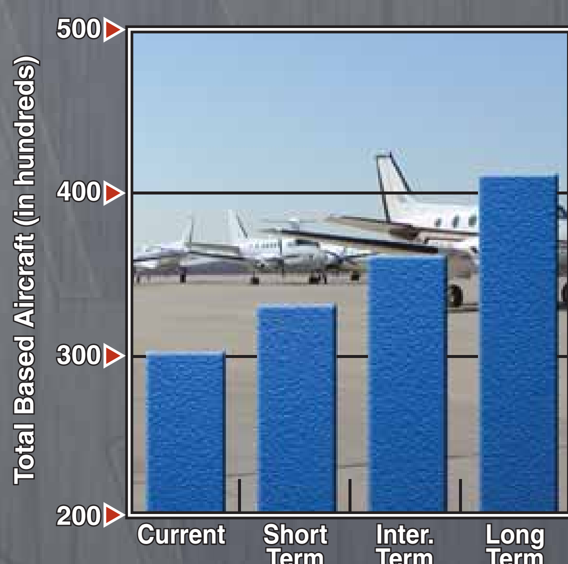
This chapter has provided demand-based forecasts of aviation activity at Arlington Municipal Airport over the next 20 years. An attempt has been made to define the projections in terms of short, intermediate, and long term expectations. Elements such as local socioeconomic indicators, anticipated regional development, and historical aviation data as well as national aviation trends were all considered when determining future conditions.

The next step in the master planning process will be to assess the capacity of existing facilities, their ability to meet forecast demand, and to identify changes to the airfield and/or landside facilities which will create a more functional aviation facility. A summary of aviation forecasts is depicted on **Exhibit 2E**.

06MP10-2E-11/22/06

	CURRENT	SHORT TERM (0 - 5 Years)	INTERMEDIATE TERM (6 - 10 Years)	LONG TERM (11 - 20 Years)
OPERATIONS				
Itinerant				
Air Taxi	4,800	6,500	8,200	13,400
General Aviation	58,900	64,500	71,300	80,150
Military	500	500	500	500
Total Itinerant	64,200	71,500	80,000	94,050
Local	81,100	89,000	90,700	94,100
Night Time Operations	6,400	7,150	8,000	9,400
TOTAL OPERATIONS	**151,700**	**167,650**	**178,700**	**197,550**
AIA's	**184**	**790**	**880**	**1,035**
BASED AIRCRAFT				
Single Engine	209	230	250	272
Multi-Engine	57	56	55	54
Turboprop	12	15	18	31
Jet	6	10	15	28
Helicopter	15	17	19	22
Tilt Rotor	2	2	3	3
TOTAL BASED AIRCRAFT	**301**	**330**	**360**	**410**





Arlington Municipal Airport

Exhibit 2E
FORECAST SUMMARY

Arlington Municipal Airport

Chapter Three

AIRPORT FACILITY REQUIREMENTS

AIRPORT FACILITY REQUIREMENTS

CHAPTER 3

To properly plan for the future of Arlington Municipal Airport, it is necessary to translate forecast aviation demand into the specific types and quantities of facilities that can adequately serve this identified demand. This chapter uses the results of the forecasts conducted in Chapter Two, as well as established planning criteria, to determine the airside (i.e., runways, taxiways, navigational aids, marking and lighting) and landside (i.e., hangars, aircraft parking apron, and automobile parking) facility requirements.

The objective of this effort is to identify, in general terms, the adequacy of the existing airport facilities, outline what new facilities may be needed, and when these may be needed, to accommodate forecast demand. Having established these facility requirements, alternatives for providing these facilities will be evaluated in Chapter Four.

AIRFIELD CAPACITY

Airfield capacity is measured in a variety of different ways. The **hourly capacity** measures the maximum number of aircraft operations that can take place in an hour. The **annual service volume** (ASV) is an annual level of service that may be used to define airfield capacity needs. **Aircraft delay** is the total delay incurred by aircraft using the airfield during a given timeframe. FAA Advisory Circular 150/5060-5, *Airport Capacity and Delay*, provides a methodology for examining the operational capacity of an airfield

for planning purposes. This analysis takes into account specific factors about the airfield. These various factors are depicted in **Exhibit 3A**. The following describes the input factors as they relate to Arlington Municipal Airport:

Runway Configuration – The existing runway configuration consists of a single runway, Runway 16-34.

Runway Use – Runway use is normally dictated by wind conditions. The direction of take-offs and landings are generally determined by the speed and direction of the wind. It is generally safest for aircraft to takeoff and land into the wind, avoiding a crosswind (wind that is blowing perpendicular to the travel of the aircraft) or tailwind components during these operations. Prevailing winds are from the south approximately 70 percent of the year. The availability of instrument approaches is also considered. Runway 34 is the only runway served by a straight-in instrument approach procedure. Runway 16, however, is served by circling approaches.

Exit Taxiways - Based upon mix, taxiways located between 2,000 and 4,000 feet from the landing threshold count in the exit rating for each runway. There are currently two exits available within this range for each runway direction. Therefore, the exit rating is two for both directions.

Weather Conditions – The airport operates under visual meteorological conditions (VMC) 89 percent of the time. Instrument meteorological conditions (IMC) occur when cloud ceilings are between 500 and 1,000 feet and visibility is between one and three statute miles. This occurs eight percent of the time. Poor visibility conditions (PVC) apply for minimums below 500 feet and one mile. This occurs approximately three percent of the time.

Aircraft Mix - Aircraft mix for the capacity analysis is defined in terms of four aircraft classes. Classes A and B consist of small and medium-sized propeller and some jet aircraft, all weighing 12,500 pounds or less. These aircraft are associated primarily with general aviation activity, but do include some air taxi, air cargo, and commuter aircraft. Class C consists of large multi-engine aircraft weighing between 12,500 pounds and 300,000 pounds. These aircraft include most business jets and larger general aviation and commuter propeller aircraft. Class D aircraft consists of large aircraft weighing more than 300,000 pounds. These aircraft are associated with airline and air cargo activities, and include the DC-10, Boeing 767, and Boeing 747. The airport does not experience operations by Class D aircraft.

Based on air traffic forecasts presented in the previous chapter, the percentage of Class C aircraft operating at the airport is projected to increase throughout the planning period. The increase in operational percentages of Class C aircraft can be attributed primarily to the increased use of corporate jet aircraft by businesses nationwide. Arlington Municipal Airport is, and will continue to be, an attractive option for corporate operators due to its location and facilities. At present, it is estimated that Class C aircraft comprise approximately

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Exhibit 3A
AIRFIELD CAPACITY FACTORS

seven percent of annual operations. This figure is projected to increase to approximately eleven percent by the end of the planning period.

Percent Arrivals – Generally follows the typical 50-50 percent split.

Touch-and-Go Activity – Touch-and-go activity has been estimated to currently account for 60 percent of total annual operations. Over the long term, the percentage of local operations is projected to decrease to approximately 52 percent of total operations.

Peak Period Operations – For the airfield capacity analysis, average daily operations and average peak hour operations during the peak month area, as calculated in the previous section, are utilized. Typical operations activity is important in the calculation of an airport's annual service volume as "peak demand" levels occur sporadically. The peak periods used in the capacity analysis are representative of normal operational activity and can be exceeded at various times throughout the year.

CALCULATION OF ANNUAL SERVICE VOLUME

The preceding information was used in conjunction with the airfield capacity methodology developed by the FAA to determine airfield capacity for Arlington Municipal Airport.

Hourly Runway Capacity

The first step in determining annual service volume involves the computation of the hourly capacity of each runway configuration. The percentage use of each runway, the amount of touch-and-go training activity, and the number and location of runway exits become important factors in determining the hourly capacity of each runway configuration.

As previously mentioned, the mix of aircraft operating at an airport remains relatively steady with operations by Class C aircraft progressively representing a slightly higher overall percentage of total annual operations. This progression would be representative as corporate aircraft operations will likely increase at a greater rate than other general aviation operations.

Annual Service Volume (ASV)

Once the hourly capacity is known, the ASV can be determined. Annual service volume is calculated by the following equation:

Annual Service Volume = C x D x H	
C =	weighted hourly capacity
D =	ratio of annual demand to average daily demand during the peak month
H =	ratio of average daily demand to average peak hour demand during the peak month

Following this formula, the current ASV for Arlington Municipal Airport has been estimated at 212,000 operations. In the short term, ASV increases slightly to 214,000, and by the long term, the ASV reaches 223,000 annual operations.

Delay

As the number of annual aircraft operations approaches the airfield's capacity, increasing amounts of delay to aircraft operations begin to occur. Delays occur to arriving and departing aircraft in all weather conditions. Arriving aircraft delays result in aircraft holding outside the airport traffic area. Departing aircraft delays result in aircraft holding at the runway end until released by the airport traffic control tower (ATCT).

Currently, total annual delay at the airport is estimated at 0.7 minutes per aircraft operation or 1,770 annual hours. It should be noted that delays of five to ten times the average could be experienced by individual aircraft during peak periods. If no capacity improvements are made, annual delay can be expected to reach 4,610 hours by the long range planning horizon. This calculates to an average delay of 1.4 minutes per aircraft. The FAA threshold for significant delay is four minutes, thus Arlington Municipal Airport appears to provide enough capacity through the planning period.

Conclusion

Table 3A summarizes annual service volume values. **Exhibit 3B** compares annual service volume to existing and forecast operational levels. The 2005 total of 151,700 operations represented 71.6 percent of the existing annual service volume. By the end of the long term planning period, total annual operations are expected to represent 88.6 percent of annual service volume.

TABLE 3A
Airfield Demand/Capacity Summary
Arlington Municipal Airport

	PLANNING HORIZON			
	Current	**Short Term**	**Intermediate Term**	**Long Term**
Operational Demand				
Annual	151,700	167,650	178,700	197,550
Design Hour	64	68	69	70
Capacity				
Annual Service Volume	212,000	214,000	222,000	223,000
Percent Capacity	71.6	78.3	80.5	88.6
Weighted Hourly Capacity	88	86	86	85
Delay				
Per Operation (Minutes)	0.70	0.88	0.90	1.40
Total Annual (Hours)	1,770	2,458	2,680	4,610

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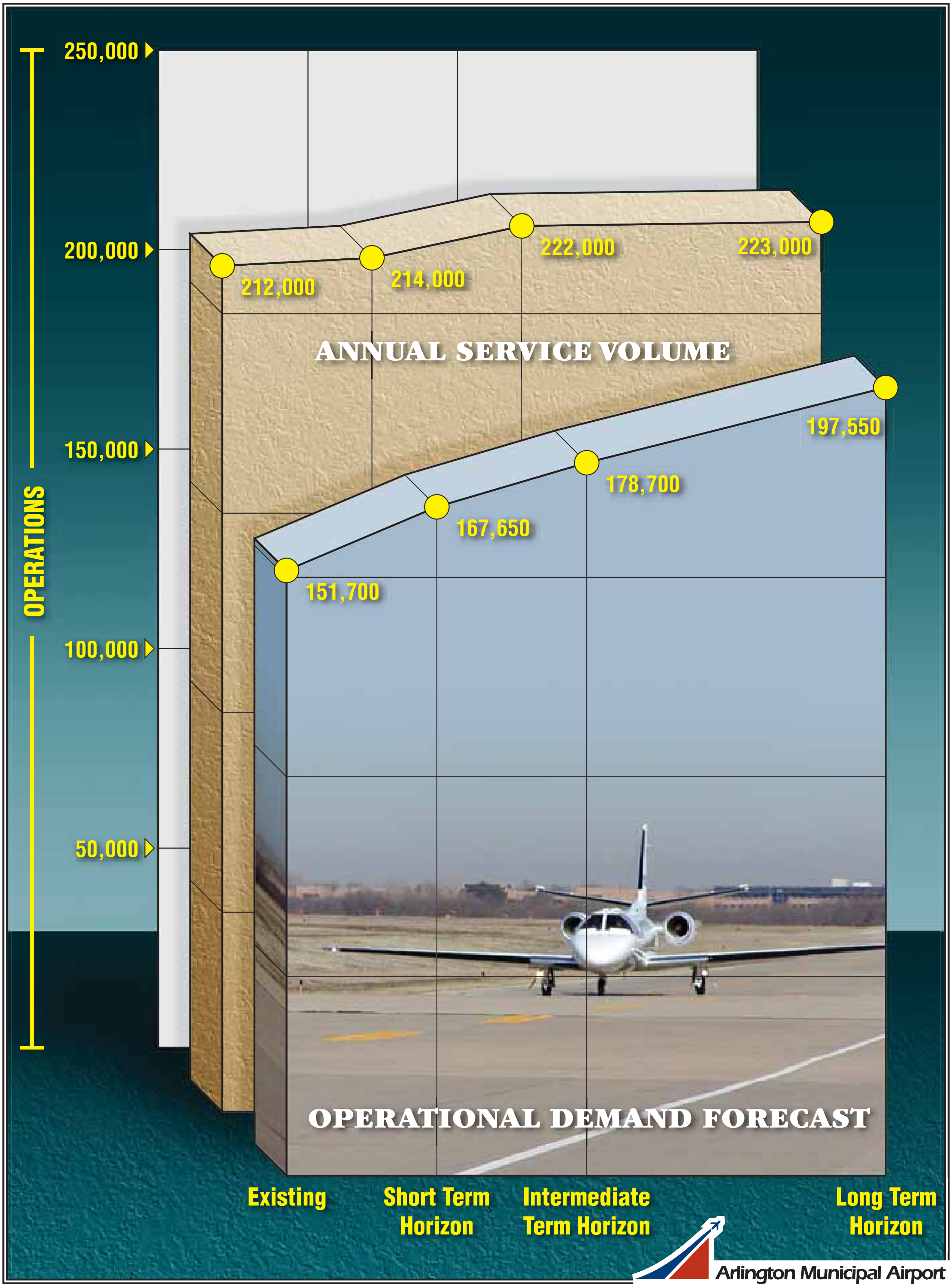

Exhibit 3B
DEMAND VS. CAPACITY

FAA Order 5090.3B, *Field Formulation of the National Plan of Integrated Airport Systems* (*NPIAS*), indicates that improvements for airfield capacity purposes should begin to be considered once operations reach 60 to 75 percent of the annual service volume. This is an approximate level to begin the detailed planning of capacity improvements. Actual implementation may be deferred until such time that the improvement is considered timely and cost-beneficial.

Although capacity constraints are not an issue at the airport currently, capacity forecasts indicate that improvements may benefit the airport by the long term. Improvements such as high-speed taxiway exits can add as much as 10 percent to overall capacity. The most beneficial improvement for capacity enhancement would be the construction of a parallel runway. While this option would significantly improve capacity at the airport, no room is available to implement a parallel runway. Another factor which could improve capacity would be additional instrument approaches with lower weather minimums. These options will be considered further in Chapter Four.

AIRFIELD PLANNING CRITERIA

The selection of appropriate Federal Aviation Administration (FAA) and Texas Department of Transportation (TxDOT) - Aviation Division design standards for the development and location of airport facilities is based primarily upon the characteristics of the aircraft which are currently using, or are expected to use, the airport.

The FAA has established a coding system to relate airport design criteria to the operational and physical characteristics of aircraft expected to use the airport. This code, the airport reference code (ARC), has two components: the first component, depicted by a letter, is the aircraft approach speed (operational characteristic); the second component, depicted by a Roman numeral, is the airplane design group and relates to aircraft wingspan (physical characteristic). Generally, aircraft approach speed applies to runways and runway-related facilities, while aircraft wingspan primarily relates to separation criteria involving taxiways, taxilanes, and landside facilities. **Exhibit 3C** depicts typical aircraft within each ARC.

According to FAA Advisory Circular (AC) 150/5300-13, Change 10, *Airport Design*, an aircraft's ***approach category*** is based upon 1.3 times its stall speed in landing configuration at that aircraft's maximum certificated weight. The five approach categories used in airport planning are as follows:

Category A: Speed less than 91 knots.
Category B: Speed 91 knots or more, but less than 121 knots.
Category C: Speed 121 knots or more, but less than 141 knots.
Category D: Speed 141 knots or more, but less than 166 knots.
Category E: Speed greater than 166 knots.

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A-I

- Beech Baron 55
- Beech Bonanza
- Cessna 150
- Cessna 172
- Cessna Citation Mustang
- **Eclipse 500**
- Piper Archer
- Piper Seneca

C-I, D-I

- Beech 400
- **Lear** 25, 31, **35**, 45, 55, 60
- Israeli Westwind
- HS 125-400, 700

B-I *less than 12,500 lbs.*

- Beech Baron 58
- Beech King Air 100
- Cessna 402
- **Cessna 421**
- Piper Navajo
- Piper Cheyenne
- Swearingen Metroliner
- Cessna Citation I

C-II, D-II

- Cessna Citation III, VI, VIII, X
- **Gulfstream** II, III, **IV**
- Canadair 600
- ERJ-135, 140, 145
- CRJ-200, 700, 900
- Embraer Regional Jet
- Lockheed JetStar
- Super King Air 350

B-II *less than 12,500 lbs.*

ï **Super King Air 200**
ï Cessna 441
ï DHC Twin Otter

C-III, D-III

- ERJ-170, 190
- Boeing Business Jet
- B 727-200
- **B 737-300 Series**
- MD-80, DC-9
- Fokker 70, 100
- A319, A320
- Gulfstream V
- Global Express

B-I, B-II *over 12,500 lbs.*

- Super King Air 300
- Beech 1900
- Jetstream 31
- Falcon 10, 20, 50
- Falcon 200, 900
- **Citation II**, III, IV, V
- Saab 340
- Embraer 120

C-IV, D-IV

- **B-757**
- B-767
- C-130
- DC-8-70
- DC-10
- MD-11
- L1011

A-III, B-III

- DHC Dash 7
- **DHC Dash 8**
- DC-3
- Convair 580
- Fairchild F-27
- ATR 72
- ATP

D-V

- **B-747** Series
- B-777

Note: Aircraft pictured is identified in bold type.

Exhibit 3C
AIRPORT REFERENCE CODES

The ***airplane design group (ADG)*** is based upon either the aircraft=s wingspan or tail height, whichever is greater. For example, an aircraft may fall in ADG II for wingspan at 70 feet, but ADG III for tail height at 33 feet. This aircraft would be classified under ADG III. The six ADGs used in airport planning are as follows:

ADG	Tail Height (feet)	Wingspan (feet)
I	<20	<49
II	20-<30	49-<79
III	30-<45	79-<118
IV	45-<60	118-<171
V	60-<66	171-<214
VI	66-<80	214-<262

Source: AC 150/5300-13, Change 10

The FAA recommends designing airport functional elements to meet the requirements of the most demanding ARC for that airport. The majority of aircraft currently operating at the airport are small single engine aircraft weighing less than 12,500 pounds. The airport also has a high volume of corporate aircraft ranging from the smaller Cessna Citation and Lear family of business jets to the Gulfstream V, which can weigh more than 90,000 pounds. Moreover, the airport is frequented by cargo aircraft such as the Boeing 727 and DC-9 which weigh more than 100,000 pounds.

In order to determine facility requirements, an actual ARC should first be determined, then appropriate airport design criteria can be applied. According to the *Policies and Standards* document from TxDOT, the critical aircraft, or aircraft family, must have or be forecast to have at least 250 annual operations within one year and 500 operations within five years. To determine if Arlington Municipal Airport meets this threshold, a review of the type of aircraft currently using and expected to use Arlington Municipal Airport follows.

CRITICAL AIRCRAFT

Defining the actual critical aircraft can sometimes be a difficult task. Often, the design aircraft is based upon the most demanding aircraft actually based at the airport, where in other cases itinerant operations can define the critical aircraft. Typically, more than one aircraft will compose the critical aircraft. For example, one aircraft could be the most critical for approach speed (e.g., ARC D-I), while another would be the most critical for wingspan (e.g., ARC C-III). As such, the critical aircraft will typically be defined by a family of similar aircraft which operate at the airport on a regular basis. Considering all aircraft types at the airport is important to ensure all facilities at the airport are properly planned.

The design standards have been developed in order to assure that existing and planned facilities will be adequate to meet specific aircraft demands. Arlington Municipal Airport is currently designated as a Transport Airport in the *Texas Airport System Plan* (TASP). In general, transport airports should be designed to handle business jet and turboprop aircraft. This designation generally corresponds to a design standard of ARC C-II.

There are currently 301 based aircraft at Arlington Municipal Airport. Included in this number are 69 multi-engine aircraft. Of this number, 12 are turboprops and 57 are piston-engines. These aircraft range from ARC A-I to ARC B-II. There are six jets based at the airport. They include one Cessna Citation Jet and one Rockwell Sabre 60 (ARC B-I), two Cessna Citation 500 series (ARC B-II), one Hawker 800 (ARC B-II), and one Lear 35 (ARC C-I). Before making a final determination of the critical aircraft family, an examination of the transient business jet aircraft using the airport should also be considered.

Jet Operations

Transient aircraft utilizing the airport include a wide array of business jets including the Citations (500, 525, 550, 560, 650, 750), Falcons (50, 900, 2000) Learjets (24, 25, 31, 35, 45, 55, 60), Challengers (600 and 604), and Gulfstreams (II, III, IV, V). These jet aircraft range from ARC B-I to D-III. The following analysis of the itinerant jet aircraft usage at the airport will aid in determining the actual design standard of the airport.

Table 3B presents private jet operations at Arlington Municipal Airport from August 29, 2005, to August 30, 2006 (12-month operational count). These privately owned and operated aircraft are not flown under Federal Aviation Regulation (F.A.R.) Part 135 (considered air taxi). These operations would be considered itinerant general aviation operations.

The operations presented in **Table 3B** represent the operations logged by both airport administration and a private consultant, GCR, Inc. Airport staff members have logged most business jet operations at the airport whenever time and staffing has allowed. GCR, Inc. provides a service called Airport IQ. This service collects into a database all instrument flight rule (IFR) flight plan aircraft operations which were opened or closed on the ground at Arlington Municipal Airport. Many aircraft operators, however, elect to file their flight plan in the air after departure, or close their flight plan in the air prior to landing at the airport. In either situation, the operations are not credited to the airport and would not be reflected in the table. Based on the limitations of both sources, it is reasonable to assume that the actual number of private business jet operations at Arlington Municipal Airport is higher than presented in the table. It is believed that this information is sufficient to provide an adequate understanding of the airport's critical aircraft.

There were a total of 1,324 operations by privately owned business jet aircraft, with 58 of these having an unknown aircraft model. Of the 1,266 positively identified aircraft, 468 were conducted by aircraft in ARC C-I or larger. The greatest number of operations in any single ARC family was 656 in ARC B-II, while ARC C-I aircraft registered 280 operations. Of the positively identified aircraft, 37 percent of private itinerant business jet operations at the airport were conducted by aircraft in ARC C-I or greater.

TABLE 3B
Total Private Jet Operations (Minimum)
Arlington Municipal Airport
August 29, 2005 - August 30, 2006

Airport Reference Code	Aircraft Type	Annual Operations	%	Number of Jets	%
A-III	DeHavilland Dash 8	2	0.2%	1	0.4%
Total A-III		**2**	**0.2%**	**1**	**0.4%**
B-I	Cessna 500	42	3.2%	4	1.5%
	Cessna 501	72	5.4%	5	1.9%
	Premier 390	4	0.3%	2	0.7%
	Mitsubishi MU-300	16	1.2%	5	1.9%
	Falcon 10	6	0.5%	2	0.7%
Total B-I		**140**	**10.6%**	**18**	**6.7%**
B-II	Cessna 525A	212	16.0%	20	7.5%
	Cessna 550	238	18.0%	27	10.1%
	Cessna 551	2	0.2%	1	0.4%
	Cessna 552	4	0.3%	1	0.4%
	Cessna 560	34	2.6%	8	3.0%
	Cessna 680	2	0.2%	1	0.4%
	Falcon 50	12	0.9%	5	1.9%
	Falcon 900	6	0.5%	3	1.1%
	Falcon 2000	20	1.5%	5	1.9%
	Hawker 700	74	5.6%	2	0.7%
	Hawker 800	52	3.9%	9	3.4%
Total B-II		**656**	**49.5%**	**82**	**30.7%**
C-I	Lear 24	10	0.8%	2	0.7%
	Lear 25	24	1.8%	5	1.9%
	Lear 31	12	0.9%	5	1.9%
	Lear 35	106	8.0%	25	9.4%
	Lear 36	2	0.2%	1	0.4%
	Lear 45	36	2.7%	12	4.5%
	Lear 55	18	1.4%	7	2.6%
	IAI Westwind	40	3.0%	7	2.6%
	Beech 400	32	2.4%	12	4.5%
Total C-I		**280**	**21.1%**	**76**	**28.5%**
C-II	Cessna 650	38	2.9%	6	2.2%
	Cessna 750 (X)	14	1.1%	6	2.2%
	Gulfstream G-200	2	0.2%	1	0.4%
	Gulfstream III	2	0.2%	1	0.4%
	Gulfstream G-1159	8	0.6%	3	1.1%
	IAI Galaxy	2	0.2%	1	0.4%
	Sabre 65	2	0.2%	1	0.4%
	Hawker 1000	2	0.2%	1	0.4%
	Challenger 600	28	2.1%	13	4.9%
	Challenger 604	2	0.2%	1	0.4%
	Challenger BD-100	6	0.5%	3	1.1%
	Embraer 135BJ	2	0.2%	1	0.4%
Total C-II		**108**	**8.2%**	**38**	**14.2%**
D-I	Lear 60	18	1.4%	7	2.6%
Total D-I		**18**	**1.4%**	**7**	**2.6%**
D-II	Gulfstream II	10	0.8%	5	1.9%
	Gulfstream IV	42	3.2%	13	4.9%
Total D-II		**52**	**3.9%**	**18**	**6.7%**

TABLE 3B (Continued) Total Private Jet Operations (Minimum) Arlington Municipal Airport August 29, 2005 - August 30, 2006					
Airport Reference Code	**Aircraft Type**	**Annual Operations**	**%**	**Number of Jets**	**%**
D-III	Gulfstream V	10	0.8%	3	1.1%
Total D-III		**10**	**0.8%**	**3**	**1.1%**
Unknown Models*		**58**	**4.4%**	**24**	**9.0%**
Total Activity		**1,324**	**100.0%**	**267**	**100.0%**

Source: Airport management records and AirportIQ.com utilizing FAA data
* Specific aircraft models not known from Lear, Cessna, Falcon, Hawker, and Gulfstream families

The table also presents the number of operations by specific aircraft type. The Cessna 550 model, which includes two based jets, performed the most business jet operations (238) at the airport. There were 27 different Cessna 550s aircraft which accounted for this total. Other aircraft that recorded a significant number of operations included the Cessna 525A (212), Hawker 700 (74), Lear 35 (106), Westwind (40), and Gulfstream IV (42).

The most demanding privately operated business jet aircraft, in terms of ARC design standard, has been the Gulfstream V. The Gulfstream V is classified by the FAA as ARC D-III. Aircraft such as the Gulfstream II and IV also utilize the airport and fall in the ARC D-II category. Several ARC C-II operations by the Challenger 604 and Cessna Citation 650 and 750 were also conducted at the airport over the last year.

Table 3C provides additional information for the private business jet operations at Arlington. An important consideration when analyzing runway length requirements is the stage length, or flying distance, an aircraft will complete from the airport. Longer stage lengths will require aircraft to carry more fuel, thus, making the aircraft heavy on take-off. This results in the need for longer take-off roll, especially on hot days. **Table 3C** presents operator data, including origination and/or destination, for large privately owned business jets operating at the airport over the last year.

The airport was utilized by a wide variety of corporate users with varying originations and destinations. The originations/destinations presented in the table represent the most demanding operations (e.g., longest haul lengths) for the most demanding aircraft. It should be noted that most of the private business jet operations over the last year originated from or were destined to an intrastate location. A large portion of the traffic, however, originated from or departed to points beyond the State of Texas, including locales on both coasts.

TABLE 3C
Representative Private Jet Operations
Arlington Municipal Airport
August 29, 2005 - August 30, 2006

		Most Demanding Representative Users	
Aircraft Type	**ARC**	**Operator Name**	**Origin/Destination**
Gulfstream V	D-III	Gulfstream International Corp.	Detroit, MI; Grand Rapids, MI
Gulfstream V	D-III	Suntrust Leasing Corp.	Detroit, MI; Grand Rapids, MI
Gulfstream IV	D-II	AVN Air LLC	Detroit, MI
Gulfstream IV	D-II	Chase Manhattan Bank	White Plains, NY
Gulfstream IV	D-II	Crown Credit Company LTD	Wapakoneta, OH
Gulfstream IV	D-II	Paul Davril, Inc.	Albany, GA
Gulfstream IV	D-II	Prime Jet LLC	Las Vegas, NV; Washington D.C.
Gulfstream IV	D-II	Red Baron, Inc.	Teterboro, NJ
Gulfstream IV	D-II	Wells Fargo Bank	Washington D.C.
Gulfstream IV	D-II	Whiskey Romeo Owner LLC	Las Vegas, NV; Santa Monica, CA
Lear 60	D-I	Bank of America	Indianapolis, IN
Challenger 600	C-II	Affiliated Computer Services, Inc	Lake Charles, LA; Exuma Intl. Airport; Ft. Lauderdale, FL
Challenger 600	C-II	Airush, Inc.	Nashville, TN
Challenger 600	C-II	Ariana LLC	Ft. Lauderdale, FL; Detroit, MI
Cessna 750 (X)	C-II	Bank of America	Grand Rapids, MI; Little Rock, AR; Birmingham, AL; Kansas City, KS
Cessna 750 (X)	C-II	Bitz Aviation, Inc.	Pittsburgh, PA; Las Vegas, NV
Cessna 650	C-II	Bohemian Air LLC	Fort Collins/Loveland, CO
Gulfstream III	C-II	CAR LLC	Coeur D'Alene, ID; Miami, FL
Challenger 600	C-II	Chase Manhattan Bank	Jackson, MS; Minneapolis/St. Paul, MN
Cessna 650	C-II	Circuit City Stores	Richmond, VA
IAI Galaxy	C-II	Fort Calumet Co.	Chicago, IL; Burlington, WI
Cessna 650	C-II	General Motors Corp.	Detroit, MI
Challenger 600	C-II	GT601 LLC	St. Joseph, MO
Cessna 750 (X)	C-II	Harrahs Operating Co., Inc.	New Orleans, LA
Cessna 650	C-II	Hillenbrand Industries, Inc.	Hillenbrand, IN
Challenger 600	C-II	Indianapolis Motor Speedway LLC	Terre Haute, IN
Gulfstream G-1159	C-II	Jet-A-Way Charters LLC	Cleveland, OH
Cessna 750 (X)	C-II	Limerick Aviation LLC	Las Vegas, NV; Brainerd, MN
Gulfstream III	C-II	MW Sky LLC	Las Vegas, NV
Gulfstream III	C-II	N848RJ, Inc.	Chicago, IL
Challenger 600	C-II	OD Aviation, Inc.	Palm Beach, FL
Challenger 600	C-II	Sunbird Aviation LLC	Orange County, CA
Gulfstream III	C-II	Paragan Leasing LLC	Denver, CO
Challenger 600	C-II	Wingedfoot Services LLC	Hailey, ID; Palm Beach, FL

IAI: Israel Aircraft Industries
Source: AirportIQ.com utilizing FAA data

Another segment of corporate aircraft users operate under F.A.R. Part 135 (air taxi) rules for hire and through fractional ownership programs. Air taxi operators are governed by FAA rules which are more stringent than those required for private aircraft owners. For example, aircraft operating under Part 135 rules must inflate their calculated runway length requirements by 20 percent for safety factors. Fractional ownership operators are actual aircraft owners who acquire a portion of an aircraft with the ability to use any aircraft in the program=s fleet. These programs have become quite popular over the last several years, especially since 9/11. Some of the most notable fractional ownership programs include NetJets, Bombardier Flexjet, Citation Shares, and Flight Options.

From August 29, 2005, to August 30, 2006, air taxi and fractional ownership operators accounted for an additional 714 business jet operations at Arlington Municipal Airport. **Table 3D** provides additional information regarding the ARC of many of the aircraft utilized by the fractional and charter companies which operate at Arlington Municipal Airport.

Critical Design Aircraft Conclusion

The largest based aircraft in terms of aircraft reference code (ARC) will often account for the design standard to be applied to the airport. The largest aircraft currently based at Arlington Municipal Airport are ARC B-II (Hawker 800) and ARC C-I (Lear 35). The combination of these aircraft yield an ARC C-II as the critical design for based aircraft. The analysis then examined the itinerant aircraft operating at the airport. The largest itinerant aircraft operating at the airport include the G-V (D-III), Boeing 727, and DC-9 (ARC C-III).

At non-towered airports, determining a reasonable operational count by aircraft type can be difficult. At the time this chapter was written, the Arlington Municipal Airport ATCT had been operational for approximately two months. Fortunately, airport staff records and data provided by GCR Airport IQ provide representative data. Again, this data as presented above represents the absolute minimum number of business jet operations. Actual operations are likely higher as airport staff and Airport IQ may have missed some aircraft operations.

The combination of private itinerant jet (1,324), air taxi jet (506), and fractional jet operations (208) indicates that, at a minimum, there were 2,038 itinerant jet operations at Arlington Municipal Airport over a one-year period, as presented in **Table 3E**. Of those, aircraft in ARC B-II accounted for 1,012 operations. Aircraft in ARC C-I and C-II conducted another 590 operations. Aircraft in ARC D-I and D-II accounted for 74 operations, while ARC C-III and D-III aircraft made 156 operations. It appears that operations made by aircraft in approach category C and airplane design group II meet TxDOT's threshold for critical aircraft design. Thus, the current critical aircraft for Arlington Municipal Airport is ARC C-II.

TABLE 3D
Representative Air Taxi Jet Usage
August 29, 2005 - August 30, 2006
Arlington Municipal Airport

Operator	Aircraft	ARC	Destination	Operations
Air Taxi Operations				
Air Cargo Carriers	Falcon 20	B-II	Cincinnati, OH; Detroit, MI; Little Rock, AR; Chicago, IL	24
Air Link Express	Falcon 900	B-II	Detroit, MI	2
	Falcon 10	B-I	Little Rock, AR	2
	Falcon 20	B-II	Chicago, IL; Little Rock, AR	4
Air Transport	Lear 25	C-I	Nebraska	2
	Lear 35	C-I	Detroit, MI	8
American International Airways	DC-9	C-III	Flint, MI	2
Ameristar Jet Charter	Lear 24	C-I	Sandusky, OH; Chicago, IL	18
	Lear 25	C-I	Roxboro, NC; Rochester, NY	32
	DC-9	C-III	Louisville, KY; Detroit, MI	4
	Falcon 20	B-II	Ft. Smith, AR; Indianapolis, IN; Chicago, IL; Knoxville, TN; Jackson, MS	42
Averitt Air Charter	Lear 31	C-I	Nashville, TN	2
	Lear 55	C-I	Nashville, TN	2
Cherry Air	Falcon 20	B-II	Louisville, KY; Indianapolis, IN; Dayton, OH	10
	Lear 25	C-I	Laredo, TX; Dayton, OH	8
Contract Air Cargo	Boeing 727	C-III	McAllen, TX; Port Isabel, TX	4
Corporate Express	Falcon 20	B-II	Memphis, TN; Grand Rapids and Detroit, MI	10
Jet Aviation Business	Falcon 20	B-II	Dupage, IA	4
Kalitta Flying Service	Boeing 727	C-III	Detroit, MI	2
	DC-9	C-III	Kansas City, MO	6
	Lear 24	C-I	Detroit, MI	2
	Lear 25	C-I	Detroit, MI; Little Rock, AR	8
	Falcon 20	B-II	Little Rock, AR; Indianapolis, IN; Muskegon, MI	16
Omni Air Intl.	Lear 35	C-I	Tulsa, OK; Teterboro, NJ	8
PHH Aviation	Falcon 900	B-II	Houston, TX	2
Raytheon Aircraft Co.	Premier 390	B-1	Akron/Canton, OH	4
Redwing Airways	DC-9	C-III	Laredo, TX; El Paso, TX	8
Royal Air Freight	Lear 45	C-I	Holland, MI	2
	Falcon 20	B-II	Cincinnati, OH; Smyrna, TN; El Paso, TX;	12
	Lear 25	C-I	Detroit, MI; Lorain County, OH	28
	Lear 24	C-I	Lexington, KY; Detroit, MI; Dayton, OH; Indianapolis, IN	28
Sierra West Airlines	Lear 35	C-I	El Paso, TX; Del Rio, TX	4
Tag Aviation USA	Falcon 900	B-II	Denver, CO	2
	Citation 560	B-II	Kansas City, MO	4

TABLE 3D (Continued)
Representative Air Taxi Jet Usage
August 29, 2005 - August 30, 2006
Arlington Municipal Airport

Operator	Aircraft	ARC	Destination	Operations
Air Taxi Operations (Continued)				
USA Jet Airlines	DC-9	C-III	Lansing, MI; Flint, MI; Detroit, MI; Toledo, OH; Indianapolis, IN; Laredo, TX	120
	Falcon 20	B-II	Grand Rapids, MI; Indianapolis, IN; Detroit, MI; Kansas City, MO; South Bend, IN; Nashville, TN	70
Fractional Ownership Operations				
Bombardier Business Jet Solutions	Challenger 600	C-II	Austin, TX; Atlanta, GA	4
	Lear 45	C-I	New Orleans, LA; Sugar Land, TX	4
	Lear 60	D-I	Uvalde, TX	4
Citation Shares	Citation 560	B-II	Miami, FL	4
	Citation 550	B-II	Eagle, CO; Palm Beach FL; Fort Walton Beach, FL; Olathe, KS	34
	Citation 680	B-II	Childress, TX	2
	Citation 525	B-II	Louisville, KY	4
Executive Jet	Citation 680	B-II	Columbus, OH	2
Executive Jet Aviation	Citation 680	B-II	Fargo, ND; Brownsville, TX	4
	Citation 560	B-II	Quincy, IL; Santa Barbara, CA; Tallahassee, FL; Hays, KS	76
	Falcon 20	B-II	Kansas City, MO; Tulsa, OK	10
	Citation 750 (X)	C-II	New Orleans, LA; Jacksonville, FL; Seattle, WA, Van Nuys, CA	18
	Beechjet 400	C-I	Omaha, KS; Pueblo, CO; Montgomery, AL	12
	Hawker 700	B-II	Houston, TX	2
Flight Options	Citation 650	C-II	Hayden, CO	2
	Hawker 700	B-II	Denver, CO; Cleveland, OH; Hayden, CO; Aspen, CO	12
	Falcon 50	B-II	Cleveland, OH; Santa Fe, NM	4
	Beechjet 400	C-I	New Orleans, LA; Palm Beach, FL	10

Source: GCR Airport IQ

TABLE 3E
Minimum Itinerant Jet Operations by ARC
Arlington Municipal Airport

Aircraft Reference Code (ARC)	Private Jet Ops	Charter Jet Ops	Fractional Jet Ops	Total
A-III	2	0	0	2
B-I	140	6	0	146
B-II	656	202	154	1,012
C-I	280	152	26	458
C-II	108	0	24	132
C-III	0	146	0	146
D-I	18	0	4	22
D-II	52	0	0	52
D-III	10	0	0	10
Unknown Aircraft Models	58	0	0	58
Totals	**1,324**	**506**	**208**	**2,038**

Source: Airport management records and AirportIQ

In the short term (within five years), the critical aircraft can be expected to shift to D-II. Increased corporate aircraft utilization is typical at general aviation airports surrounded by growing or established population and employment centers. Once utilized only by large conglomerate-type corporations, corporate aircraft (especially jets) have been increasingly utilized by a wider variety of companies. FAA trends indicate that businesses are increasingly utilizing corporate aircraft. This is also evident by the substantial growth of fractional ownership programs. The fractional ownership programs have shown significant growth in numbers of aircraft owners joining their programs. These national factors, coupled with a strong socioeconomic condition in the area, will influence additional corporate aircraft demand. The growing demand will elect to utilize those airports that provide facilities that meet their needs.

Tarrant County is expected to support positive population and employment growth in the future. Moreover, the City of Arlington is also expected to grow. In fact, the City's diverse and dynamic economy will welcome the Dallas Cowboys in the near future. These trends and developments will position the airport well for serving the growing aviation demand. In addition, Arlington Municipal Airport has already developed a reputation in the general aviation community as a clean, attractive airport, with highly competitive fuel prices. Other amenities, such as the new airport traffic control tower and an instrument landing system (ILS) to be installed within the next year will certainly attract more air traffic, especially business jets.

As previously discussed, one of the most visible trends in general aviation today is the growth of the fractional ownership programs, and corporate aircraft use in general. Planning for fractional ownership aircraft is difficult as it is an on-demand service, however, since these aircraft currently operate at the airport, planning should consider meeting the needs of the majority of highly-utilized fractional ownership aircraft. Although these aircraft can range up to ARC D-III, most fractional ownership aircraft are in ARC B-I to C-II. Thus, future facility planning should include the potential for the airport to be utilized by the majority of business jets on the market.

The previous chapter indicated that by the long term planning period, 28 jets are forecast to be based at the airport. Thus, the combination of operations by based business jet aircraft, along with transient corporate jet operations, will determine the critical aircraft for the airport.

It should be noted that there is a significant number of C-III operations at the airport represented by the DC-9 and Boeing 727 aircraft. These aircraft haul freight for local businesses. Operations by these aircraft do not currently meet the threshold for critical aircraft design. If at any point in time the number of these operations should increase or if the Boeing Business Jet (BBJ) (ARC C-III) were to operate at the airport, the critical aircraft could transition to C-III.

In conclusion, the current ARC for the airport is C-II. In the very short term, the ARC could transition to ARC D-II or even C-III should there be an increase in charter operations by the DC-9 and/or Boeing 727. Should a larger business jet, such as a Gulfstream II, IV or V be based at the airport, the ARC could transition to approach category D. Ultimate planning should conform to ARC C/D-III. It should be noted that there are few design standard differences between the C/D-II and C/D-III aircraft. These differences will be identified as the facility requirements are studied throughout this chapter.

AIRFIELD REQUIREMENTS

Airfield requirements include the need for those facilities related to the arrival and departure of aircraft. The adequacy of existing airfield facilities at Arlington Municipal Airport has been analyzed from a number of perspectives, including:

- Safety Area Design Standards
- Runways
- Taxiways
- Airfield Lighting, Marking, and Signage
- Navigational Approach Aids

SAFETY AREA DESIGN STANDARDS

The FAA has established several safety surfaces to protect aircraft operational areas and keep them free from obstructions that could affect the safe operation of aircraft. These include the runway safety area (RSA), obstacle free area (OFA), and runway protection zone (RPZ). The dimensions of these safety areas are dependent upon the critical aircraft and, thus, the ARC of the runway.

Runway Safety Area (RSA)

The RSA is defined in FAA Advisory Circular 150/5300-13, Change 10, *Airport Design*, as a Asurface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.@ The RSA is centered on the runway, dimensioned in accordance to the approach speed of the critical aircraft using the runway. The FAA requires the RSA to be cleared and graded, drained by grading or storm sewers, capable of accommodating the design aircraft and fire and rescue vehicles, and free of obstacles not fixed by navigational purpose.

The FAA has placed a higher significance on maintaining adequate RSAs at all airports due to recent aircraft accidents. Under Order 5200.8, effective October 1, 1999, the FAA established a *Runway Safety Area Program*. The Order states, AThe objective of the Runway Safety Area Program is that all RSAs at federally-obligated airports . . . shall conform to the standards contained in Advisory Circular 150/5300-13, *Airport Design*, to the extent practicable.@ Each Regional Airports Division of the FAA is obligated to collect and maintain data on the RSA for each runway at the airport, and perform airport inspections. Texas, as a block-grant state, has given the inspection and data collection responsibility to TxDOT-Aviation Division for general aviation airports.

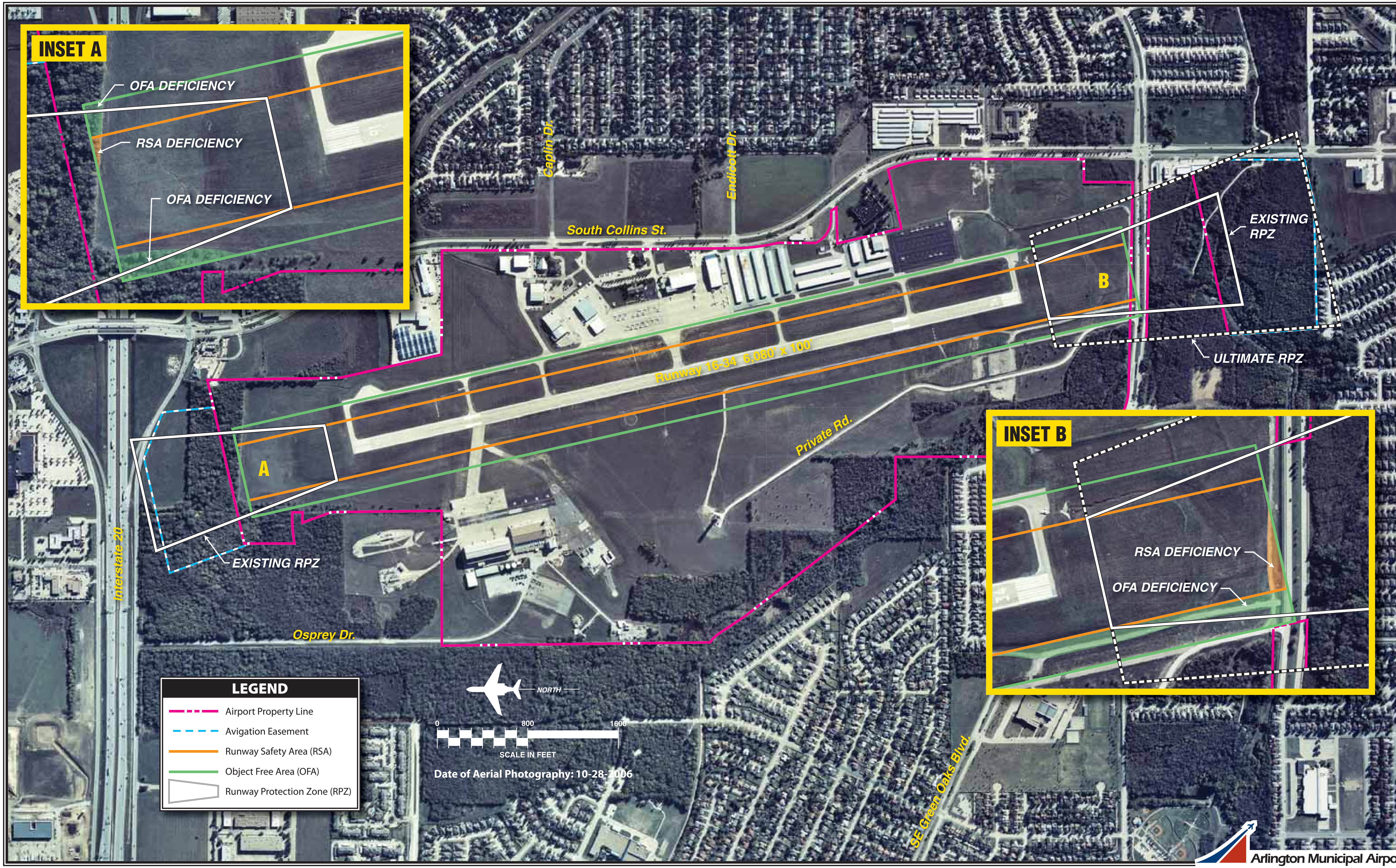
For ARC C-II aircraft, the FAA calls for the RSA to be 500 feet wide and extend 1,000 feet beyond the runway ends. Analysis in the previous section indicated that Runway 16-34 should be planned to accommodate aircraft up to and including ARC C/D-III. The RSA for ARC C/D-III aircraft is also 500 feet wide and extends 1,000 feet beyond each runway end.

Exhibit 3D depicts the RSA requirements for Runway 16-34. The majority of the RSA conforms to current standards; however, it appears that the northeastern and southwestern-most portions of the RSA are obstructed. In the northeastern corner, trees and the perimeter fence appear to cross into the RSA, while perimeter fencing and the abandoned airport perimeter service road obstruct the southwestern RSA. The installation of the ILS will correct all deficiencies except the perimeter fence in the southwestern RSA.

It should be noted that the aerial photography provides a good base for comparison; however, more detailed topographic information will be used in the following chapter to determine if the RSA is truly obstructed.

Object Free Area (OFA)

The runway OFA is "a two-dimensional ground area, surrounding runways, taxiways, and taxilanes, which is clear of objects except for objects whose location is fixed by function (i.e., airfield lighting)." The OFA is centered on the runway, extending out in accordance to the critical aircraft design category utilizing the runway.



06MP10-3D-12/4/06

Exhibit 3D
SAFETY AREAS

For ARC C-II aircraft, the FAA calls for the OFA to be 800 feet wide, extending 1,000 feet beyond each runway end. The standard for C/D-III aircraft would also require the OFA to be a cleared area 800 feet wide and 1,000 feet beyond each runway end.

Exhibit 3D also depicts the OFA for Runway 16-34. Similar to the RSA, it appears that the OFA is obstructed, even more significantly so. The southwestern OFA line follows the airport traffic control tower service road but extends onto Southeast Green Oaks Boulevard. The northwestern and northeastern portions of the OFA extend beyond airport fencing into treed areas. More detailed analysis of the runway OFA will be completed in the following chapter utilizing topographic survey information.

Obstacle Free Zones (OFZ)

Runways served by an instrument approach, such as Runway 34, must consider the FAA=s criteria for the OFZ. The OFZ is an imaginary surface which precludes object penetrations, including taxiing and parked aircraft. The only allowance for OFZ obstructions is visual navigational aids mounted on frangible bases which are fixed in their location by function.

The FAA requires a cleared OFZ extending 200 feet beyond the runway pavement ends and 200 feet to either side of the runway for those instrument runways utilized by aircraft over 12,500 pounds. The OFZ is established to ensure the safety of aircraft operations. If the OFZ is obstructed, the airport=s approaches could be removed or approach minimums could be increased. Currently, there are no OFZ obstructions at Arlington Municipal Airport. Future planning should maintain the OFZ. **Table 3F** presents the existing C-II safety area design standards and the ultimate C/D-III safety area design standards.

TABLE 3F
Runway Safety Design Standards
Arlington Municipal Airport

	Runway 16-34	
	Existing Standards	**Ultimate Standards**
Airport Reference Code (ARC)	**C-II**	**C/D-III**
Runway Safety Area		
Width (ft.)	500	500
Length Beyond Runway End (ft.)	1,000	1,000
Object Free Area		
Width (ft.)	800	800
Length Beyond Runway End (ft.)	1,000	1,000
Obstacle Free Zone		
Width (ft.)	400	400
Length Beyond Runway End (ft.)	200	200

Source: FAA AC 150/5300-13, Change 10, Airport Design

Runway Protection Zones (RPZ)

Another consideration is the FAA recommendation for compatible land uses. The runway protection zone (RPZ) is a trapezoidal area centered on the runway, typically beginning 200 feet beyond the runway end. The RPZ has been established by the FAA to provide an area clear of obstructions and incompatible land uses in order to enhance the safety of approaching aircraft, as well as people and property on the ground. The dimensions of the RPZ vary according to the visibility minimums serving the runway and the type of aircraft operating on the runway.

The RPZ for ARC C/D-II and ARC C/D-III aircraft is the same as long as visibility minimums are not lower than one mile. When visibility minimums are provided below one mile, RPZs expand significantly. The alternatives chapter will consider the possibility of improved minimums and thus, the dimension of the RPZs will expand. Future plans should consider acquiring any property not contained inside the existing or planned RPZs. The dimensions for the current and planned runway protection zones are presented in **Table 3G**.

TABLE 3G
Runway Protection Zones (RPZ)
Arlington Municipal Airport

	Existing		**Ultimate**	
Runway	**16**	**34**	**16**	**34**
Approach Visibility Minimums	Circling Only	1 mile (VOR and GPS)	Circling Only	½ mile (ILS, VOR, GPS)
Inner Width (ft.)	500	500	500	1,000
Outer Width (ft.)	1,010	1,010	1,010	1,750
Length (ft.)	1,700	1,700	1,700	2,500

Source: FAA AC 150/5300-13, Change 10, *Airport Design*

RUNWAYS

The adequacy of the existing runway system at Arlington Municipal Airport has been analyzed from a number of perspectives, including runway orientation, runway length, pavement strength, width, and safety standards. From this information, requirements for runway improvements were determined for the airport.

Runway Orientation

The airport is served by single runway system. Runway 16-34 is orientated in a northwest-southeast manner. For the operational safety and efficiency of an airport, it is desirable for the runway to be oriented as close as possible to the direction of the prevailing wind. This reduces the impact of wind components perpendicular to the direction of travel of an aircraft that is landing or taking off.

FAA Advisory Circular 150/5300-13, Change 10, *Airport Design,* recommends that a crosswind runway should be made available when the primary runway orientation provides less than 95 percent wind coverage for specific crosswind components. The 95 percent wind coverage is computed on the basis of the crosswind component not exceeding 10.5 knots (12 mph) for ARC A-I and B-I; 13 knots (15 mph) for ARC A-II and B-II; 16 knots (18 mph) for ARC C-I through D-II; and 20 knots for ARC A-IV through D-VI.

Wind data specific to the airport was not available; however, data for Dallas/Fort Worth International Airport (1988-1997) provides adequate information for use in this study. This data is graphically depicted on the windrose in **Exhibit 3E**.

As depicted on the exhibit, Runway 16-34 provides 96.40 percent wind coverage for 10.5 knot crosswinds, 98.41 percent at 13 knots, 99.58 percent at 16 knots, and 99.91 percent at 20 knots. Runway 16-34 exceeds the 95 percent wind coverage component. The analysis indicates that the existing runway provides adequate crosswind coverage for all aircraft. Thus, a crosswind runway is not considered.

Runway Length

Runway length requirements are based upon five primary elements: airport elevation, the mean maximum daily temperature of the hottest month, runway gradient, critical aircraft type expected to use the runway, and aircraft loading. Aircraft performance declines as elevation, temperature, and runway gradient factors increase. Therefore, these factors increase runway length requirements. For calculating runway length requirements at Arlington Municipal Airport, elevation is 628 feet above mean sea level (MSL), and the mean maximum daily temperature of the hottest month is 95 degrees Fahrenheit. The maximum elevation difference for Runway 16-34 is 31 feet. Runway 16-34 has a longitudinal gradient of 0.51 percent. For aircraft in approach categories A and B, the runway longitudinal gradient cannot exceed two percent. For aircraft in approach categories C and D, the maximum allowable longitudinal runway grade is 1.5 percent.

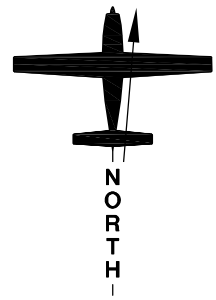
Table 3H outlines the runway length requirements for various classifications of aircraft that utilize Arlington Municipal Airport. These standards were derived from the FAA Airport Design Computer Program for recommended runway lengths.

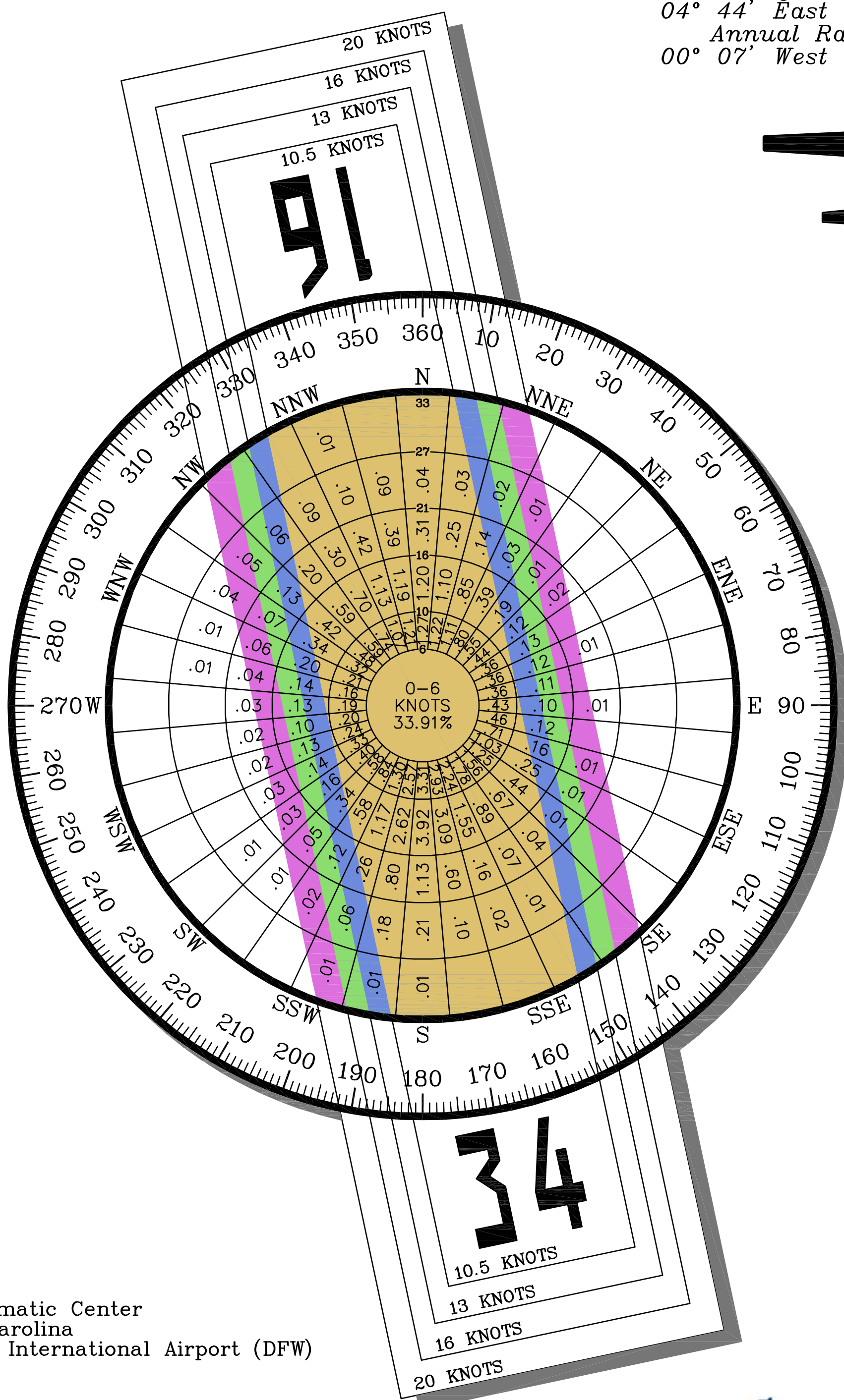
Draft 06MP10-3E-12/05/06

ALL WEATHER WIND COVERAGE

Runway	10.5 Knots	13 Knots	16 Knots	20 Knots
Runway 16-34	*96.40%*	*98.41%*	*99.58%*	*99.91%*

Magnetic Variance
04° 44' East (November 2006)
Annual Rate of Change
00° 07' West (November 2006)





SOURCE:
NOAA National Climatic Center
Asheville, North Carolina
Dallas/Fort Worth International Airport (DFW)
Dallas, Texas

OBSERVATIONS:
85,043 All Weather Observations
1988-1997

Arlington Municipal Airport

Exhibit 3E
WINDROSE

TABLE 3H **Runway Length Requirements** **Arlington Municipal Airport**	
Airport and Runway Data	
Airport elevation	628 feet MSL
Mean daily maximum temperature of the hottest month	95 degrees F
Maximum difference in runway centerline elevation	31 feet
Length of haul for airplanes of more than 60,000 pounds	1,400 miles
Dry runways	
Runway Length Recommended for Airport Design	
Small airplanes with less than 10 passenger seats	
75 percent of these small airplanes	2,800 feet
95 percent of these small airplanes	3,300 feet
100 percent of these small airplanes	4,000 feet
Small airplanes with 10 or more passenger seats	4,500 feet
Large airplanes of 60,000 pounds or less	
75 percent of business jets at 60 percent useful load	5,200 feet
75 percent of business jets at 90 percent useful load	7,500 feet
100 percent of business jets at 60 percent useful load	6,200 feet
100 percent of business jets at 90 percent useful load	9,500 feet
Airplanes of more than 60,000 pounds	7,000 feet
Source: FAA Airport Design Computer Program utilizing Chapter Two of AC 150/5325-4A, *Runway Length Requirements for Airport Design*	

According to the FAA design program, to accommodate 75 percent of business jet aircraft at 60 percent useful load, the runway length should be at least 5,200 feet. To accommodate 100 percent of business jets at 60 percent useful load, the runway should be 6,200 feet long.

In late 2004, the FAA released a draft update to Advisory Circular (AC) 150/5325-4B, *Runway Length Requirements for Airport Design*. The updated AC identifies those aircraft that were used in calculating the lengths required in **Table 3G**. For example, the "75 percent fleet at 60 percent useful load" provides a runway length *sufficient to satisfy the operational requirements* of approximately 75 percent of the fleet at 60 percent useful load. The AC also provides direction on runway length for aircraft operating at 90 percent useful load.

Paragraph 306 of the AC recognizes that general aviation airports are being used more frequently by business jets. General aviation (GA) airports "that receive regular use by large airplanes over 12,500 pounds, in addition to business jets, should provide a runway length comparable to non-GA airports." That is, the extension of an existing runway can be justified at an existing GA airport that has a need to accommodate heavier airplanes on a "frequent basis." This directly applies to Arlington Municipal Airport and needs to be planned for accordingly.

The top half of **Table 3J** presents the list of those aircraft which make up 75 percent of the active business jet fleet category in the FAA's runway length computer model presented in **Table 3H**. Aircraft listed in the bottom half of **Table 3J** represent those aircraft used for the 100 percent category.

TABLE 3J
Aircraft Type as a Percent of the Business Jet Fleet
Arlington Municipal Airport

Manufacturer	Models
Aircraft that make up 75 percent of the fleet per Table 3H	
Beech Jet	400
Cessna	500, 525, 550, 560, 650 (Citation VII)
Dassault	Falcon 10, 20, 50, 900
Hawker	400, 600
IAI	Westwind 1123/1124
Learjet	20, 31, 35, 36, 40, 45
Mitsubishi	300
Sabreliner	40, 60, 75/80, T-39
Bae	125-700
Raytheon	Premier 390
Aerospatiale	Sn-601 Corvette
Aircraft that make up 100 percent of the fleet per Table 3H	
Bombardier	Challenger 600, 604, BD-100
Cessna	650 (Citation III/VI), 750 (Citation X)
Dassault	Falcon 900EX, 2000
IAI	Astra 1125, Galaxy 1126
Learjet	55, 60
Hawker	800, 800EX, 1000
Sabreliner	65, 75

Source: FAA AC 150/5325-4B

Since it is known that most of the aircraft listed in the 100 percent of the business jet category utilize Arlington Municipal Airport on a frequent basis, consideration should be given to providing adequate runway length for their safe and efficient operation. **Thus, ultimate planning should consider providing a minimum runway length of 6,200 feet**.

Haul Length

The FAA Computer Program also provides an estimation of runway lengths for general aviation aircraft weighing more than 60,000 pounds. This group includes the Gulfstream family of aircraft and some new long-range corporate jets. The estimate of runway length requirements for the large corporate aircraft over 60,000 pounds considers all airfield data, but also considers the typical haul distance.

The origin/destination of many aircraft utilizing the airport was previously identified in **Tables 3C** and **3E**. The larger Gulfstream jets had haul lengths of nearly 1,400 miles, to destinations such as White Plains, NY, and Teterboro, NJ. Other destinations included Detroit, MI (1,000 mi.), Washington, D.C. (1,200 mi.), Las Vegas, NV (1,000 mi.), and Santa Monica, CA (1,200 mi.). Since it is known that, when conditions allow, business jet operators are opting for longer haul lengths, consideration will be given to accommodate aircraft weighing more than 60,000 pounds with haul lengths of 1,400 miles. As indicated in **Table 3H**, aircraft weighing more than 60,000 pounds, with haul lengths of 1,400 miles, require a runway length of 7,000 feet.

Specific Aircraft Requirements

An additional consideration for runway length is to analyze the runway length requirements of specific aircraft currently utilizing or planned to utilize Arlington Municipal Airport in the future. **Table 3K** presents the runway length needs for a wide variety of business jets, as obtained from the operations manuals for each aircraft. Figures in the table consider maximum take-off and landing weights. It should be noted that landing length requirements during contaminated runway conditions (rainy, with 1/10-inch of water on the runway) increase significantly for aircraft with single-wheel landing gear configurations due to hydroplaning potential.

In general, the data specific to each airplane presented in **Table 3K** is similar to the generalized output by the FAA computer program (presented in **Table 3G**). Obviously, airport planning cannot always conform to the worst case (maximum load) scenario. Planning should at least conform to providing a runway length capable of accommodating the majority of aircraft most of the year. In other words, the runway should be capable of handling business jets with typical weight loading during moderate heat conditions.

Several aircraft which currently utilize the airport on an infrequent basis can require runway lengths longer than the current 6,080 feet provided by Runway 16-34. The Lear 55, Gulfstream IV and V, Hawker 800, and Challenger require up to 7,000 feet. These aircraft are capable of operating at the airport, but are weight-restricted during hot weather days. Weight restrictions can include taking less fuel and making an additional stop along the intended route, boarding fewer passengers, or taking less cargo. During cooler days, the weight restrictions could be minor or may be unnecessary.

Runway Length Summary

Many factors are considered when determining appropriate runway length for the safe and efficient operation of aircraft at Arlington Municipal Airport. The starting point for analysis begins with running the FAA Airport Design Computer Program. This program is based on the criteria for runway length set forth in AC 150/5300, *Airport Design*. The output from the computer program shows a number of different runway lengths based on aircraft characteristics such as useful load, haul length, and percent of active business jets. The results of the computer program show that, at a minimum, the runway should be at least 6,200 feet long in order to accommodate 100 percent of the business jet fleet at 60 percent useful load. This would be adequate for almost all C-II business jets.

TABLE 3K
Runway Length Requirements (Maximum Take-off/Landing Weights)
Arlington Municipal Airport

	Runway Length Required (in feet) for:		
Aircraft Type	**Take-off at 95 F**	**Landing on Dry Runway**	**Landing on Contaminated Runway**
Beechjet 400	5,900	4,500	6,000
Challenger CL600	6,900	5,500	7,000
Cessna 550	5,500	2,900	6,000
Cessna 650	6,000	5,300	6,100
Gulfstream IV	7,000	5,400	6,200
Gulfstream V	7,000	4,500	5,500
Hawker 800	8,000	4,000	6,000
Hawker 1000	7,500	5,000	5,600
IAI Westwind	7,300	3,500	7,000
IAI Astra	7,000	5,000	5,000
Lear 35	6,000	3,400	7,000
Lear 55	7,300	3,200	6,400

Source: Aircraft Operating Manuals

An additional consideration is the haul length for aircraft weighing over 60,000 pounds. For business jets, this would include the Gulfstream family of aircraft. Flight plan data that was collected and analyzed showed that when conditions allow (i.e., cooler, dry days), those heavier business jets will take on longer haul lengths, up to and beyond 1,400 miles. The FAA Computer Program calls for a runway length of 7,000 feet for these aircraft.

An additional source for necessary runway length is the actual operation manuals from those business jets utilizing the airport. Analysis indicated that a number of these aircraft have runway length needs that exceed the current 6,080 feet. Some had requirements for over 7,000 feet under extreme conditions (full load, above 95 degrees).

Corporate aviation departments and fractional ownership programs often restrict what airports they can use based on runway length. Often, these groups will restrict operations to those runways that have adequate runway length, plus a buffer. Obviously, the longer the runway, the more opportunity these aircraft operators will have to use the airport. Moreover, fractional aircraft and charter operators must increase their landing runway length requirement by 20 percent under F.A.R. Part 135 rules.

Forecast future demand at Arlington Municipal Airport indicates that the airport should strive to accommodate all business jet operations up to and including those in ARC C/D-III. Thus, alternative analysis should consider the possibility of lengthening Runway 16-34 to provide optimal runway length of up to 7,000 feet.

Analysis in the next chapter will examine potential runway extensions that could be achieved. The analysis will factor constraints which could hinder runway extension, including roads, environmental considerations, and costs. It is important to note that TxDOT and the FAA will require specific justification for the runway to be extended. The type of aircraft, its specific runway requirements, and frequency of operation will need to be provided for funding assistance. Therefore, current record-keeping of business jet operators should be maintained and should include company names, aircraft types, and frequency of operation at the airport, where possible. Also, airport administration should request that corporate aircraft operating at the airport provide, in writing, their established runway length requirements.

Runway Width

Runway 16-34 is currently 100 feet wide. FAA design standards call for a runway width of 100 feet to serve aircraft up to ARC C/D-III, regardless of instrument approach visibility minimums. Also, TxDOT standards call for a 100-foot-wide runway for transport category airports. Runway 16-34 currently meets FAA and TxDOT criteria for runway width and should be maintained as such.

It should be noted, however, that the FAA runway width standard for C/D-III aircraft, with maximum certified take-off weights greater than 150,000 pounds, is 150 feet. This standard was specifically tailored for the Boeing 727 due to its wide wheel base. This group now also includes the BBJ with newer models certified for up to 170,000 pounds. If the Boeing 727 and/or the BBJ increasingly utilize the airport to the point of representing the critical aircraft, the runway may need to be widened to 150 feet.

The runway shoulder for Group II aircraft is 10 feet, and for Group III it is 20 feet. The shoulder areas should be designed to provide resistance to blast erosion and to accommodate the passage of vehicles. Currently, the runway meets Group II standards, but falls short of Group III standards.

Runway Strength

The pavement rating for Runway 16-34 is 60,000 pounds single wheel loading (SWL). As previously mentioned, SWL refers to the aircraft weight based upon the landing gear configuration with a single wheel on the landing strut.

The runway strength is adequate to accommodate all ARC C-II aircraft and nearly all C/D-III business jets. This strength is not capable, however, of meeting the needs of heavily loaded BBJ, DC-9, and Boeing 727 aircraft on a frequent basis. Limited operations can be accommodated, but heavy use by aircraft exceeding the pavement strength design can deteriorate the pavement in an accelerated manner. Given the nature of the airport and the fact that cargo operators do operate at the airport, consideration should be given to increasing the runway pavement strength. This should be considered the next time the runway pavement is rehabilitated or replaced.

Runway Separation

FAA Advisory Circular 150/5300-13, *Airport Design*, Change 10 also discusses separation distances between aircraft and various areas on the airport. The separation distances are a function of the approaches approved for the airport and the critical aircraft. Under current conditions (ARC C-II, approaches not less than three-quarters-of-a-mile) the taxiways need to be at least 300 feet from the runway centerline. The edge of aircraft parking areas should be 400 feet from the runway centerline.

The future critical aircraft, however, could transition to ARC C/D-III. The lowest approach minimums suggested are one-half mile (Runway 34). Under these circumstances, the taxiway centerline should be at least 400 feet from the runway centerline. The parking areas should be at least 500 feet from the runway centerline. The current runway to parallel taxiway separation of 400 feet is adequate to meet all future aircraft demand. Future landside development will need to occur on the west side of the airport. For this reason, a second parallel taxiway will need to be constructed on the west side of the runway. This taxiway should be located no closer than 400 feet from the runway (centerline to centerline).

TAXIWAYS

Taxiways are constructed primarily to facilitate aircraft movements to and from the runway system. Some taxiways are necessary simply to provide access between the aprons and runways, whereas other taxiways become necessary as activity increases at an airport, to provide safe and efficient use of the airfield.

As detailed in Chapter One, the taxiway system at Arlington Municipal Airport consists of a parallel taxiway and seven entrance/exit taxiways serving Runway 16-34. Parallel Taxiway A (including the north and south entrance/exit) is 45 feet wide. All other entrance/exit taxiways are 35 feet wide, except for mid-field Taxiway D, which is 75 feet wide at the runway intersection and increases to 200 feet in width as it connects to the ramp apron.

Consideration should be given to the addition of taxiways, as needed, to improve airfield circulation and capacity. The current taxiway layout appears efficient for Runway 16-34; however, if Runway 16-34 were to be extended, the parallel taxiway would need to be extended and another exit taxiway added.

Analysis earlier in this chapter indicated that projected aircraft operations will near the airport's annual service volume. As such, capacity improvements should be considered. One improvement would be the inclusion of high speed exit taxiways, which route landing aircraft from the runway quicker than traditional 90 degree exit taxiways. Ultimate planning will consider the development of high speed exit taxiways to improve airfield capacity.

Taxiway width is determined by the Airplane Design Group (ADG) of the most demanding aircraft to use the taxiway. As mentioned previously, the current critical aircraft for the airport falls within ADG II. FAA criteria call for a width of 35 feet for taxiways serving aircraft within Design Group II. All taxiways at the airport currently meet this requirement. If ADG III is to be considered, the taxiways serving these aircraft should be 50 feet wide.

As shown in **Table 3M**, a taxiway object free area (TOFA) applies to taxiways and taxilanes. The width of the TOFA is dependant on the wingspan of critical aircraft. For Group II aircraft, the TOFA is 131 feet wide. For Group III aircraft, the TOFA is 186 feet wide. Taxilane separation standards are slightly lower and generally apply taxiways routing aircraft into hangar development areas.

The separation distance between the taxiway/taxilane and any fixed or movable object is half of the TOFA. The taxiway shoulder width requirements are ten feet for Group II aircraft and 20 feet for Group III aircraft. The shoulders need to be traversable by vehicles and aircraft, should they veer off the taxiway. Often, a smooth grass surface is provided.

TABLE 3M
Taxiway Design Standards
Arlington Municipal Airport

	Airplane Design Group (ADG)	
	Group II (49' to 79' wingspan)	Group III (79' to 118' wingspan)
Taxiway Width (ft.)	35	50
Shoulder Width (ft.)	10	20
Object Free Area (ft.)		
Taxiway OFA	131	186
Taxilane OFA	115	162
Separation Distances (ft.)		
Taxiway Centerline to Object	65.5	93
Taxilane Centerline to Object	57.5	81

Source: FAA AC 150/5300-13, Airport Design, Change 10

AIRFIELD LIGHTING AND MARKING

There are a number of lighting and pavement marking aids serving pilots using the airport. These aids assist pilots in locating the airport and runway at night or in poor visibility conditions. They also assist in the ground movement of aircraft.

Runway and Taxiway Lighting

Runway identification lighting provides the pilot with a rapid and positive identification of the runway and its alignment. Runway 16-34 is equipped with medium intensity runway lighting (MIRL). The MIRL system will be adequate to serve the proposed ILS approach and should be maintained through the planning period.

TxDOT *Policies and Standards* indicate that airports having more than 100 based aircraft should be served by taxiway lights, as well as taxiway guidance signs. Currently, Arlington Municipal Airport has medium intensity taxiway lighting (MITL) and lighted taxiway signs. The runway and taxiway lighting systems are vital to the airport's operations and should be maintained throughout the planning period.

Pavement Markings

Runway markings are designed according to the type of instrument approach available on the runway. FAA AC 150/5340-1F, *Marking of Paved Areas on Airports*, provides guidance necessary to design the airport=s pavement markings. Both ends of the runway have non-precision instrument markings. These markings should be properly maintained through the planning period. Prior to the ILS becoming operational at the airport, Runway 34 should have precision markings to include runway designation, centerline, edge, threshold, touchdown zone, and aiming points. These precision markings are planned to be implemented as part of a pavement rehabilitation project in the near future.

NAVIGATIONAL AIDS AND INSTRUMENT APPROACHES

Airport and runway navigational aids are based on FAA recommendations, as defined in DOT/FAA Handbook 7031.2B, *Airway Planning Standard Number One*, FAA Advisory Circular 150/5300-2D, *Airport Design Standards, Site Requirements for Terminal Navigation Facilities*, and TxDOT=s *Policies and Standards*.

Navigational aids provide two primary services to airport operations: precision guidance to specific runway and/or non-precision guidance to a runway or the airport itself. The basic difference between a precision and non-precision navigational aid is that the former provides electronic descent, alignment (course), and position guidance, while the non-precision navigational aid provides only alignment and position location information; no elevation information is given. The necessity of such equipment is usually determined by design standards predicated on safety considerations and operational needs. The type, purpose, and volume of aviation activity expected at the airport are factors in the determination of the airport=s eligibility for navigational aids.

Global Positioning System

The advancement of technology has been one of the most important factors in the growth of the aviation industry in the second half of the twentieth century. Much of the civil aviation and aerospace technology has been derived and enhanced from the initial development of technological improvements for military purposes. The use of orbiting satellites to confirm an aircraft=s location is the latest military development to be made available to the civil aviation community.

Global positioning systems (GPS) use three or more satellites to derive an aircraft=s location by a triangulation method. The accuracy of these systems has been remarkable, with initial degrees of error of only a few meters. As the technology improves, it is anticipated that GPS may be able to provide accurate enough position information to allow category II and III precision approaches, independent of any existing ground-based navigational facilities. In addition to the navigational benefits, it has been estimated that GPS equipment will be much less costly than existing precision approach landing systems.

Instrument Approaches

Instrument approach procedures (IAP) are a series of predetermined maneuvers established by the FAA using electronic navigational aids that assist pilots in locating and landing at an airport during low visibility and cloud ceiling conditions. At Arlington Municipal Airport, there are two published instrument approaches for Runway 34. The approaches are approved for use by aircraft with approach speeds in Approach Categories A, B and C. None of the airport=s approaches are approved for Category D aircraft.

The capability of an instrument approach is defined by the visibility and cloud ceiling minimums associated with the approach. Visibility minimums define the horizontal distance that the pilot must be able to see to complete the approach. Cloud ceilings define the lowest level a cloud layer (defined as feet above the ground) can be situated for a pilot to complete the approach. If the observed visibility or cloud ceiling is below the minimums prescribed for the approach, the pilot cannot complete the instrument approach.

Future planning considers the increased use of the airport by corporate aircraft. These aircraft users will many times elect to operate only at airports served by instrument approaches. In fact, some corporate flight departments are excluded from using airports without instrument approaches. Considering the needs of these aircraft, future planning must also consider improved instrument approach procedures.

The lowest existing visibility minimum for approach to Runway 34 is one mile with the VOR/DME and RNAV (GPS). Currently, there is no straight-in approach to Runway 16. Circling minimums to Runway 16 with the VOR/DME allow for one mile visibility. Ultimate planning will consider lowering the minimums to one-half mile for Runway 34. This visibility minimum, commonly referred to as Category I (CAT I) is usually achieved with the installation of an ILS where there are no significant flight obstructions. It is unlikely that Runway 16 will be served by a straight-in instrument approach procedure due to the proximity and operations at DFW. Circling approaches are currently provided to Runway 16 and should be maintained in the future.

Additional consideration should be given to the Threshold Siting Surface (TSS), which is an area closely mirroring the runway protection zone, but extending out and up from the primary runway surface. The TSS is primarily designed to identify obstructions. Obstructions to the TSS surface need to be addressed as soon as possible to ensure the safety of pilots, aircraft, and people and objects on the ground. The current TSS slope for Runway 16-34 is 20:1. When the ILS approach to Runway 34 is implemented, the TSS slope will be 34:1, while Runway 16 will remain at 20:1.

Visual Approach Aids

To provide pilots with visual glideslope and descent information, visual approach slope indicators (VASIs) or precision approach path indicators (PAPIs) are commonly found to the side of the runway. These systems can consist of either a two or four-box unit. Four-box systems are recommended for use by business jet aircraft. Currently, both ends of Runway 16-34 are served by four-box PAPIs. These are the recommended visual descent aids and should be maintained through the planning period.

In conjunction with lowering the approach minimums to Runway 34 from one mile to one-half mile with the soon to be installed ILS, a sophisticated approach lighting system will be needed. The medium intensity approach lighting system with runway alignment indicator lights (MALSR) is commonly required. A MALSR is used by pilots to align the aircraft with the centerline of the runway and to guide aircraft to the runway end. Up to 63 steady-burning lights are used to create a reference plane, and up to eight lights create a sequential strobe flash pattern that rolls toward the runway threshold. The MALSR extends from the runway end outward to 2,400 feet. The first 1,400 feet from the threshold is the reference grid (MALS) and the last 1,000 feet is the flashing lights (RAIL).

Runway End Identification Lighting (REIL) is provided on both ends of Runway 16-34. When the full MALSR is installed on Runway 34, the REILs can be removed. REILs should be maintained on Runway 16 throughout the planning period.

Other visual approach aids include the segmented circle, the lighted wind cone and the universal beacon. These are valuable tools to pilots and should be maintained throughout the planning period.

Weather Reporting Aids

The Automated Surface Observation System (ASOS) at the airport provides critical weather information to pilots. One of the prime advantages of an ASOS is that the information is very specific to the airport environs. This system should be maintained.

The airport has a lighted wind cone and segmented circle which provide pilots with information about wind conditions and local traffic patterns. These facilities are required when an airport is not served by a 24-hour airport traffic control tower (ATCT). The ATCT at Arlington Municipal Airport is operational 14 hours per day. These facilities should be maintained in the future.

Airport Traffic Control Tower (ATCT)

As previously mentioned, Arlington Municipal Airport has an operational airport traffic control tower that is attended from 7:00 a.m. through 9:00 p.m. local time daily. The control tower is included in the FAA Contract Tower Program, which was established to provide funding for airport traffic control services at lower activity level airports. Under this program, the FAA funds all or portions of the cost of a qualified contractor to operate the ATCT. Initially, low-level FAA-operated towers were converted to the contract tower program. However, this program has grown to include establishing new services at airports which were previously without air traffic control services, which is the case at Arlington Municipal Airport. As of 2005, there were 223 airports in the FAA Contract Tower Program.

LANDSIDE REQUIREMENTS

Landside facilities are those necessary for the handling of aircraft and passengers while on the ground. These facilities provide the essential interface between the air and ground transportation modes. The capacity of the various components of each area was examined in relation to projected demand to identify future landside facility needs. This includes components for general aviation needs such as:

- Aircraft Hangars
- Aircraft Parking Aprons
- General Aviation Terminal
- Auto Parking and Access
- Airport Support Facilities

HANGARS

The demand for aircraft storage hangars typically depends upon the number and type of aircraft expected to be based at the airport. For planning purposes, it is necessary to estimate hangar requirements based upon forecast operational activity. However, hangar development should be based on actual demand trends and financial investment conditions.

Before an analysis of aircraft storage hangar requirements is given, it should be noted that a certain number of aircraft were taken out of the total current and forecast based aircraft numbers to account for Bell-Helicopter Textron, Inc. This is due to the fact that Bell-Helicopter uses its private hangar storage space for aircraft directly related to its overall operation on the airport. From based aircraft numbers provided by airport management, a determination was made that eight aircraft (helicopters and tiltrotors) are specific to Bell-Helicopter Textron, Inc.'s operations and therefore, were not included in the current and forecast based aircraft numbers used to determine hangar storage needs.

Utilization of hangar space varies as a function of local climate, security, and owner preferences. The trend in general aviation aircraft, whether single or multi-engine, is toward more sophisticated aircraft (and consequently, more expensive aircraft); therefore, many aircraft owners prefer enclosed hangar space to outside tie-downs. This is evident at Arlington Municipal Airport as approximately 54 based aircraft, or approximately 18 percent, are located on outside tie-downs. Some owners of these aircraft would prefer to be in hangars; however, with the high number of based aircraft at Arlington Municipal Airport, some hangar spaces are not readily available (especially T-hangar space). Presently, aircraft storage and maintenance and repair needs are being met through the use of T-hangars, executive hangars, and conventional hangars.

T-hangars are used for smaller single and multi-engine aircraft storage. Arlington Municipal Airport offers a number of T-hangar spaces. T-hangars are popular with aircraft owners having one aircraft as they are allowed privacy and individual access to their space. These hangars are individual spaces within a larger structure. There are 162 enclosed T-hangar units available on the airport, providing approximately 190,800 square feet of storage space.

Executive hangars are typically utilized by owners of larger aircraft or multiple aircraft. Often a corporate aviation department will operate out of an executive hangar as well. Executive hangars are usually smaller than 10,000 square feet and offer open-space storage. There are currently two executive hangar structures at Arlington Municipal Airport totaling, approximately 15,700 square feet. A maximum number of nine aircraft can be stored in these two facilities combined.

Conventional hangars are typically 10,000 square feet or larger and utilized for bulk aircraft storage and by airport businesses such as fixed base operators (FBOs), maintenance providers, and flight schools. They are open-space facilities with no supporting structure interference, similar to executive hangars. At Arlington Municipal Airport, there are eight conventional hangar facilities, totaling approximately 162,000 square feet. Of this, approximately 123,200 square feet is used for aircraft storage and 38,700 square feet used for office/maintenance areas. The approximate number of aircraft that can be stored in all conventional hangars on the airport is 68.

As the trend toward more sophisticated aircraft continues throughout the planning period, it is important to determine the need for more executive and conventional hangar space. A planning standard of 1,200 square feet was used for single engine aircraft, and 2,500 square feet for multi-engine, jets, and helicopters. Since portions of executive and conventional hangars are also used for aircraft maintenance, servicing, and office space, a planning standard of 15 percent of the total hangar space is allocated for these requirements.

Table 3N indicates that the airport should plan, in the short term, for more T-hangar and executive hangar spaces. Additional conventional hangar storage facilities are projected to be needed by the intermediate term of the planning period.

It should be noted that the exact existing storage mix is unknown. Thus, a typical storage mix was used as the baseline condition. As a result, the exact square footage needed between T-hangars and executive/conventional hangars is an approximation. The critical figure to address is the total hangar area needed. In the short term planning period, nearly 140,000 square feet of hangar space may be needed. It is expected that the aircraft storage hangar requirements will continue to be met through a combination of hangar types. The alternatives analysis will examine the options available for hangar development at the airport and determine the best location for each type of hangar facility.

TABLE 3N
Aircraft Storage Hangar Requirements
Arlington Municipal Airport

		Future Requirements		
	Current Available	Short Term	Intermediate Term	Long Term
Total Based	293	322	352	402
Aircraft to be Hangared	239	269	302	361
T-Hangar Positions	162	173	191	217
Executive Hangar Positions	9	48	55	70
Conventional Hangar Positions	68	48	56	74
Hangar Area Requirements				
T-Hangar Area	190,800	207,500	230,200	260,700
Executive Hangar Area	15,700	121,300	136,600	175,800
Conventional Hangar Area	123,200	118,800	136,800	182,600
Maintenance/Office Area	38,700	56,400	61,600	70,400
Total Hangar Area (s.f.)	**368,400**	**504,000**	**565,200**	**689,500**

Source: Coffman Associates analysis

AIRCRAFT PARKING APRON

FAA Advisory Circular 150/5300-13, *Airport Design*, Change 10, suggests a methodology by which transient apron requirements can be determined from knowledge of busy-day operations. At Arlington Municipal Airport, the number of itinerant spaces required was determined to be approximately 18 percent of the busy-day itinerant operations. A planning criterion of 800 square yards per aircraft was applied to determine future transient apron requirements for single and multi-engine aircraft. For business jets (which can be larger), a planning criterion of 1,600 square yards per aircraft position was used. For planning purposes, 75 percent of these spaces are assumed to be utilized by non-jet aircraft, which is in line with national trends.

A parking apron should provide space for the number of locally based aircraft that are not stored in hangars, transient aircraft, and for maintenance activity. Approximately 120 parking spaces are available for transient and based aircraft at the airport. Although the majority of future based aircraft were assumed to be stored in an enclosed hangar, a number of based aircraft will still tie-down outside.

Total apron parking requirements are presented in **Table 3P**. Currently, there are approximately 40 transient positions available for single and multi-engine aircraft. For planning purposes, all these positions are located on the terminal and itinerant ramp aprons adjacent to the terminal building and FBO. A total of 12 business jet positions are available adjacent to the FBO. There are also approximately 75 positions for locally based aircraft. Portions of the north ramp apron, the entire south ramp apron, and areas adjacent to the FBO were taken into account for locally based aircraft positions.

TABLE 3P
Aircraft Parking Apron Requirements
Arlington Municipal Airport

	Available	Short Term	Intermediate Term	Long Term
Single, Multi-engine Transient Aircraft Positions	40	52	58	71
Apron Area (s.y.)	23,600	41,700	46,400	56,800
Transient Business Jet Positions	12	12	15	18
Apron Area (s.y.)	15,000	19,200	24,000	28,800
Locally Based Aircraft Positions	75	63	61	51
Apron Area (s.y.)	35,400	41,000	39,500	33,400
Total Positions	**120**	**127**	**134**	**140**
Total Apron Area (s.y.)	**74,000**	**101,900**	**109,900**	**119,000**

As shown in the table, transient parking for single and multi-engine aircraft will need to be addressed in the short term. Transient business jet parking appears to be adequate, but it should be recognized that at specific times, such as during the Major League Baseball season and in the future when the National Football League Dallas Cowboys franchise relocates to Arlington, this apron will be undersized. To accommodate the increasing frequency of these busy periods, considerations will be given to conversion of some of the local tie-down space to transient aircraft parking. Moreover, future planning will include additional apron space.

GENERAL AVIATION TERMINAL FACILITIES

General aviation terminal facilities have several functions. Space is required for a pilot's lounge, flight planning, concessions, management, storage, and various other needs. This space is not necessarily limited to a single, separate terminal building, but can include space offered by FBOs for these functions and services. Currently, the airport offers a separate terminal building which provides approximately 7,000 square feet of space.

The methodology used in estimating general aviation terminal building space needs is based on the number of itinerant users expected to utilize general aviation facilities during the design hour. General aviation space requirements were then based upon providing 120 square feet per design hour itinerant passenger. Design hour itinerant passenger is determined by multiplying design hour itinerant operations by the number of passengers on the aircraft (multiplier). An increasing passenger count (from 2.1 to 2.5) is used to account for the likely increase in larger, more sophisticated aircraft using the airport. **Table 3Q** outlines the general aviation terminal facility space requirements for Arlington Municipal Airport.

TABLE 3Q
General Aviation Terminal Area Facilities
Arlington Municipal Airport

	Available	Short Term	Intermediate Term	Long Term
Design Hour Operations	64	68	69	70
Design Hour Itinerant Operations	30	32	34	36
Multiplier	2.0	2.1	2.3	2.5
Total Design Hour Itinerant Passengers	60	67	78	91
General Aviation Terminal Building Space (s.f.)	7,000	8,100	9,300	10,900

As presented in the table, the existing public space will need to be addressed in the short term of the plan. By the long term, approximately 11,000 square feet of space could be needed.

An additional consideration for terminal space is the anticipated emergence of a new class of aircraft. As mentioned in a previous chapter, a number of aircraft manufacturers will be producing low cost microjets or very light jets (VLJs). The VLJs typically have a capacity of up to six passengers. A number of new companies are positioning themselves to utilize the VLJs for on-demand air taxi services.

The air taxi businesses are banking on a desire by business travelers to avoid delays at major commercial service airports by taking advantage of the nationwide network of general aviation airports such as Arlington Municipal Airport. General aviation airports with appropriate terminal building services are better positioned to meet the needs of this new class of business traveler.

Also, with the City of Arlington being the future home of the Dallas Cowboys football franchise, it can be expected that there will be a continued increase in the amount of aircraft and passengers utilizing the airport and its terminal facilities.

SUPPORT REQUIREMENTS

Various facilities that do not logically fall within classifications of airside or landside facilities have also been identified. These other areas provide certain functions related to the overall operation of the airport and include: automobile parking, fuel storage, and aircraft rescue and firefighting facilities.

AUTOMOBILE PARKING

General aviation vehicular parking demands have also been determined for Arlington Municipal Airport. Space determinations were based on an evaluation of existing airport use, as well as industry standards. Terminal automobile parking spaces required to meet general aviation itinerant demands were calculated by multiplying design hour itinerant passengers by a multiplier of 2.1, 2.3, and 2.5 for each planning period. This multiplier represents the anticipated increase in corporate operations and, thus, passengers.

The parking requirements of based aircraft owners should also be considered. Although some owners prefer to park their vehicles in their hangars, safety can be compromised when automobile and aircraft movements are intermixed. For this reason, separate parking requirements, which consider one-half of based aircraft at the airport, were applied to general aviation automobile parking space requirements. Parking requirements for the airport are summarized in **Table 3R**.

TABLE 3R
Vehicle Parking Requirements
Arlington Municipal Airport

		Future Requirements		
	Available	Short Term	Intermediate Term	Long Term
Design Hour Itinerant Passenger	60	67	78	91
Terminal Vehicle Spaces	130	121	140	164
Parking Area (s.f.)	41,700	48,300	56,000	65,500
General Aviation Spaces	370	161	176	201
Parking Area (s.f.)	85,000	64,400	70,400	80,400
Total Parking Spaces	**500**	**282**	**316**	**365**
Total Parking Area (s.f.)	**126,700**	**112,700**	**126,400**	**145,900**

Throughout the planning period, dedicated parking spaces may not be needed as the airport provides more than forecast need. It should be noted, however, most local airport users currently travel across landside pavements in order to reach their place of business or hangar. Future planning should keep the goal in mind of limiting the potential interaction of aircraft and vehicles. Locating parking areas in useful areas is critical for a general aviation airport. If a parking area is not conveniently located, then airport users will continue to drive on aircraft surfaces.

FUEL STORAGE

The fuel farm at Arlington Municipal Airport is located on the east side of the airfield. It consists of three aboveground, 12,000-gallon storage tanks: two for Jet A fuel and the other for Avgas fuel. There is also a newly installed self-service Avgas fuel pump and 1,000-gallon storage tank located at the southeastern corner of the south ramp apron. With a credit card, one can access Avgas fuel at one's convenience. Full service Avgas and Jet A fuel are delivered to aircraft via four refueling trucks. Two Jet A fuel trucks have capacities of 5,000 and 3,000 gallons each and two Avgas fuel trucks have capacities of 1,200 and 1,000 gallons each. The fuel farm, self-service fuel area, and fuel trucks are owned and operated by Harrison Aviation, the only fuel provider on the airport.

Fuel storage requirements are typically based upon maintaining a two-week supply of fuel during an average month. However, more frequent deliveries can reduce the fuel storage capacity requirement. Generally, fuel tanks should be of adequate capacity to accept a full refueling tanker, which is approximately 8,000 gallons, while maintaining a reasonable level of fuel in the storage tank. Maintaining storage to meet a two-week supply for each is currently available.

Future Avgas and Jet A fuel storage requirements for the airport, based upon a two-week supply during the peak month, will likely exceed the existing total storage capacities. One option to address this potential storage issue is to increase the frequency of fuel deliveries. By the long term planning period, it is suggested that additional fuel storage facilities be constructed. It has been mentioned that Harrison Aviation is researching the possibility of expanding their fuel farm to increase Jet A and Avgas fuel storage capabilities in the short term.

AIRCRAFT RESCUE AND FIREFIGHTING

Arlington Municipal Airport is not currently served by a dedicated aircraft rescue and firefighting facility (ARFF). The airport is provided with rescue and fire assistance from the City of Arlington's Fire Station #12, which is located on airport property adjacent to the airport terminal building.

Fire Station #12 provides services to both the surrounding area and the airport. It is not necessary that ARFF services be located on the airport, although it serves as an added safety enhancement with personnel and equipment located on the airport. Only certified airports providing scheduled passenger service with greater than nine passenger seats are required to provide ARFF services. Many corporate flight departments, however, are requesting ARFF services at the airports they utilize. As previously mentioned, with the increasing amount of corporate jets utilizing the airport and all forecasts pointing to this continued trend, it serves Arlington Municipal Airport well to have a fire station located on the airport. Although the station is not ARFF-certified, personnel do go through regular training related to ARFF and keep specialized foaming agents designed for use with aircraft fires on location. Future consideration should be given to meeting "Index A" standards. "Index A" includes aircraft less than 90 feet in length and requires one vehicle carrying at least the following:

- 500 pounds of sodium-based dry chemical or halon 1211; or
- 450 pounds of potassium-based dry chemical and water with a commensurate quantity of Aqueous Film Forming Foam (AFFF) to total 100 gallons for simultaneous dry chemical and AFFF foam application.

SURFACE TRANSPORTATION ACCESS

Arlington Municipal Airport has excellent access to the surface transportation network, as discussed in Chapter One. South Collins Street provides direct access to Interstate 20 located directly north of the airport and points beyond. When the airport functions as a gateway to the City, it is important that surface access to the airport reflect a first class appearance that the airport itself provides. As previously mentioned, the possibility of creating more access to the airport, especially on the west side of the airfield to open it up for further development, will be discussed in the next chapter.

AIRPORT REVENUE SUPPORT

The Arlington Municipal Airport serves as a public service, an economic development engine, and a business division within the City of Arlington. In general, airport operators should strive to generate enough revenue through airport operations to be self-sufficient. Most general aviation airports, however, require some subsidy from the airport sponsor. As a result, airport operators are continually searching for opportunities for additional revenue generation.

One such opportunity for Arlington Municipal Airport may be the extraction of natural gas from airport property. On February 16, 1999, the FAA issued *Policy and Procedures Concerning the Use of Airport Revenue*, in the Federal Register. As of this publication date, "mineral and water rights represent a part of the airport property and its value" (Vol. 64, No. 30, Federal Register, Tuesday, February 16, 1999, p. 7702). Under FAA grant assurances, the City agrees that it will charge fair and equitable rates on airport property. Thus, were the airport to allow the extraction of minerals from airport property, the airport must charge fair market value for that operation. Typically, fees charged for mineral extraction are based on the volume of minerals extracted, although lucrative royalty and commission fees can also be awarded.

A common source of airport revenues is the lease of property that is not necessary for aeronautical purposes. Often, airports with surplus land will promote industrial park development. To do this, the airport sponsor must demonstrate to the FAA that any property intended for redevelopment as an industrial park is no longer needed for aeronautical purposes. This is granted by the FAA in the form of a release from federal grant assurances which state that the airport sponsor will utilize airport property for aeronautical purposes when grants are accepted.

Once a land use release is granted by the FAA, the airport sponsor can promote the airport property for industrial development. All revenue generated by the lease of land to industrial operators will be obligated to the airport. Those funds cannot be transferred to other city departments.

In the next chapter, several options for enhancing airport revenues through ineral extraction or business park development will be explored. These options will examine the feasibility of such operations and the potential location of such facilities.

SUMMARY

The intent of this chapter has been to outline the facilities required to meet potential aviation demands projected for Arlington Municipal Airport for the planning horizon. A summary of the airfield and general aviation facility requirements is presented on **Exhibits 3F** and **3G**.

Following the facility requirements determination, the next step is to determine a direction of development which best meets these projected needs. The remainder of the master plan will be devoted to outlining this direction, its schedule, and its costs.

06MP13-3F-2/22/06

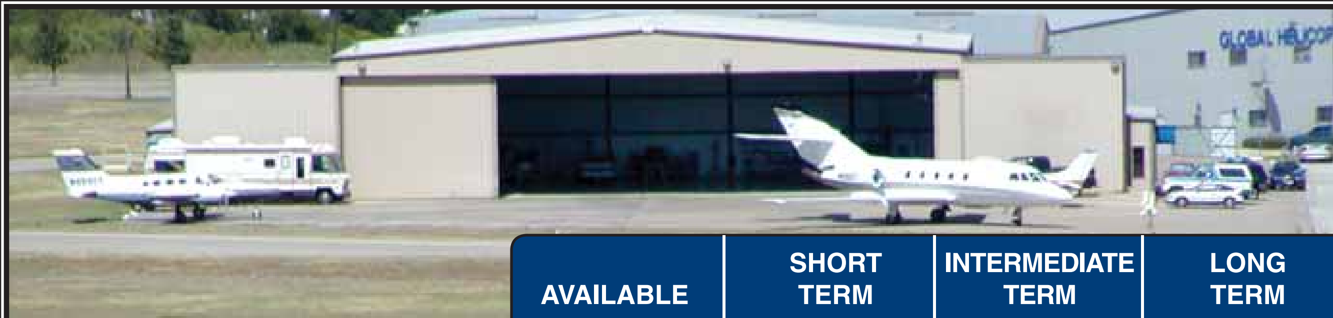
RUNWAYS	TAXIWAYS	NAVIGATIONAL AIDS	LIGHTING AND MARKING
			
AVAILABLE			
Runway 16-34 6,080' x 100' 60,000 #SWL ARC C-II Design	**Runway 16-34** Full Parallel Taxiway Seven Exits	**Runway 16-34** ATCT PAPI-4L ASOS REILS VOR/DME (34) GPS (34) RNAV (34) LPV (34)	**Runway 16-34** • Rotating Beacon • Medium Intensity Runway Lighting (MIRL) • Medium Intensity Taxiway Lighting (MITL) • Nonprecision Markings • Segmented Circle/ Lighted Windcone • Lighted Airfield Signs
SHORT TERM			
Runway 16-34 Consider: • Extending Runway up to 7,000' • Increasing Pavement Strength to 120,000 #DWL	**Runway 16-34** Consider: • West Side Parallel Taxiway • High Speed Exit(s)	**Runway 16-34** ILS (34) MALSR (34)	**Runway 16-34** Add: • Precision Markings
LONG TERM			
Runway 16-34 Consider: • Widen Runway to150'	**Runway 16-34** Consider: • Widen Some Taxiways to 50'	**SAME**	**SAME**

KEY

PAPI - Precision Approach Path Indicator
GPS - Global Positioning System
VOR/DME- Very High Frequency Omni-directional Range/Distance Measuring Equipment
VASI - Visual Approach Slope Indicator
REIL- Runway End Identification Lights
MALSR- Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
ODALS- Omni-Directional Approach Lighting System
HIRL/MIRL- High/Medium Intensity Runway Lighting
HITL/MITL- High/Medium Intensity Taxiway Lighting
NDB- Non-Directional Beacon
ATCT- Airport Traffic Control Tower
LLWAS- Low Level Windshear Alert System
ATIS- Automatic Terminal Information Services
ASOS- Automated Surface Observation System
RCO- Remote Communications Outlet

Arlington Municipal Airport

Exhibit 3F
AIRSIDE REQUIREMENTS



	AVAILABLE	SHORT TERM	INTERMEDIATE TERM	LONG TERM
Aircraft Storage Hangars				
Aircraft to be Hangared	239	269	302	361
T-Hangar Positions	162	173	191	217
Executive Hangar Positions	9	48	55	70
Conventional Hangar Positions	68	48	56	74
T-Hangar Area (s.f.)	190,800	207,500	230,200	260,700
Executive Hangar Area (s.f.)	15,700	121,300	136,600	175,800
Conventional Hangar Area (s.f.)	123,200	118,800	136,800	182,600
Maintenance Area (s.f.)	38,700	56,400	61,600	70,400
Total Hangar Area (s.f.)	368,400	504,000	565,200	689,500

Aircraft Parking Apron Area (s.y.)

Single, Multi-Engine Aircraft Positions	40	52	58	71
Apron Area (s.y.)	23,600	41,700	46,400	56,800
Transient Business Jet Positions	12	12	15	18
Apron Area (s.y.)	15,000	19,200	24,000	28,800
Locally-Based Aircraft Positions	75	63	61	51
Apron Area (s.y.)	35,400	41,000	39,500	33,400
Total Positions	120	127	134	140
Total Apron Area (s.y.)	74,000	101,900	109,900	119,000

General Aviation Facilities

Terminal Building Space (s.f.)	7,000	8,100	9,300	10,900
Terminal Building Parking Positions	130	121	140	164
General Aviation Parking Positions	370	161	176	201
Total Vehicle Parking Area (s.f.)	126,700	112,700	126,400	145,900

Exhibit 3G
LANDSIDE SUMMARY

Arlington Municipal Airport

Chapter Four

ALTERNATIVES

ALTERNATIVES

CHAPTER 4

The previous chapters have focused on the available facilities, the existing and potential future demand, as well as quantified the level of facilities that are needed both now and in the future. The purpose of this chapter is to formulate and examine rational airport development alternatives that can address the planning horizon demand levels. Because there are a multitude of possibilities and combinations thereof, intuitive judgment is necessary to focus in on those opportunities which have the greatest potential for success.

Any development proposed for a master plan is evolved from an analysis of projected needs for a set period of time. Though the needs were determined by the best methodology available, it cannot be assumed that future events will not change these needs. The master planning process attempts to develop a viable concept for meeting the needs caused by projected demands for the next 20 years. However, no plan of action should be developed which may be inconsistent with the future goals and objectives of the City of Arlington and its citizens, who have a vested interest in the development and operation of the airport.

The development alternatives for Arlington Municipal Airport can be categorized into two functional areas: airside (runways, navigational aids, taxiways, etc.) and landside (general aviation hangars, aprons, and terminal area). Within each of these areas, specific facilities are required or desired. In addition, the utilization of the remaining airport property to provide revenue support for the airport

and to benefit the economic development and well-being of the regional area must be considered.

Each functional area interrelates and affects the development potential of the others. Therefore, all areas must be examined individually, and then coordinated as a whole to ensure the final plan is functional, efficient, and cost-effective. The total impact of all these factors on the existing airport must be evaluated to determine if the investment in Arlington Municipal Airport will meet the needs of the community, both during and beyond the planning period.

When analyzing alternatives for development, consideration must be given to a "do nothing" or "no-build" alternative. Additional consideration will be given to the possibility of removing aviation services altogether and transferring aviation activity to surrounding airports.

The alternatives considered are compared using environmental, economic, and aviation factors to determine which of these alternatives will best fulfill the local aviation needs. With this information, as well as the input and direction from local government agencies and airport users, a final airport concept can evolve into a realistic development plan.

NON-DEVELOPMENT ALTERNATIVES

Non-development alternatives include the "do nothing" or "no build" alternative, transferring service to an existing airport, or developing an airport at a new location. These alternatives need to be examined first to determine whether future development of Arlington Municipal Airport is in the best interest of the City of Arlington and the region as a whole.

"DO NOTHING" ALTERNATIVE

The "do nothing" alternative essentially considers keeping the airport in its present condition and not providing for any type of improvement to the existing facilities. The primary result of this alternative would be the inability of the airport to satisfy the projected aviation demands of the airport service area.

The Dallas / Fort Worth Metroplex has experienced strong growth in all socioeconomic categories over the past several years. Forecasts indicate this trend will likely continue throughout the long range planning horizon. Moreover, the City of Arlington is located in the heart of the Metroplex and serves as a vital economic asset for the surrounding area. It is home to the Texas Rangers Major League Baseball franchise and, beginning in the fall of 2009, the Dallas Cowboys National Football League franchise will play at its new stadium located in Arlington. These professional sporting venues, as well as many major business enterprises located in Arlington, make it a location which requires the support of a highly functional airport to meet the needs of recreational users as well as business users. These reasons, combined with favorable regional and national aviation forecasts, indicate a future need for improved facilities at Arlington Municipal Airport. Improvements recommended in the previous chapter include a longer runway, providing a higher pavement weight bearing strength, improvements to the taxiway system, improvement of navigational aids, construction of additional hangar facilities, and improvements to the ground access routes serving the airport. Without these improvements, regular users of the airport will be constrained from taking maximum advantage of the airport's air transportation capabilities.

The unavoidable consequence of the "do nothing" alternative would involve the airport's inability to attract potential airport users. Corporate aviation plays a major role in the transportation of business leaders and key employees. Thus, an airport's facilities are often the first impression many corporate officials will have of the community. If the airport does not have the capability to meet the hangar, apron, or airfield needs of potential users, the City's capability to attract the major sector businesses that rely on air transportation could be diminished.

The long term consequences of the "do nothing" alternative extend beyond the City of Arlington. Arlington Municipal Airport is part of a system of public airports that serve the aviation needs of the region. The airport is a reliever to Dallas / Fort Worth International Airport and Dallas Love Field. As such, the airport has a responsibility to provide adequate facilities to support the full range of general aviation activity so as to reduce congestion and relieve capacity constraints at these commercial service airports. Thus, the effects of the "do nothing" alternative would not only impact the City of Arlington, Tarrant County, and Dallas County, but the entire region.

To propose no further development at Arlington Municipal Airport could adversely affect the long term viability of the airport, resulting in negative economic effects on the City of Arlington and the region as a whole. Therefore, the "do nothing" alternative is not considered to be prudent or feasible.

TRANSFER AVIATION SERVICES

The alternative of shifting aviation services to another existing airport was found even less desirable due to the impact that a transfer would have on both the existing Arlington Municipal Airport users as well as other airports in the region. With 301 based aircraft and approximately 152,000 annual operations, the relocation of services would affect the capacity of other airports in the Dallas / Fort Worth area. Not only this, but there is no other centrally located airport between the cities of Dallas and Fort Worth that can provide the levels of service that Arlington has to offer.

The Dallas / Fort Worth Metroplex is served by several airports, including 11 reliever airports. Even with the large variety of airports in this region, shifting demand from Arlington Municipal Airport would be very difficult. Many of the reliever airports are somewhat congested, and many have little space available to accommodate additional aircraft. Some airports have space, but no existing facilities to accommodate a large shift of demand.

Grand Prairie Municipal Airport is located three nautical miles to the northeast. This airport has a single runway that is 4,001 feet long, clearly inadequate for business jet activity. Due to the lack of available space on and around the airport, it is restricted in future growth. Mid-Way Regional Airport, located 15 nautical miles southeast of Arlington, provides a 5,000-foot-long runway that will be extended to 6,500 feet by the end of this year. Mid-Way could accommodate a shift of some of the aviation activity from Arlington if additional landside improvements were made. Due to its location well south of Arlington, however, it would be less accessible to users of the immediate area.

Dallas Executive Airport, Fort Worth Spinks Airport, and Fort Worth Meacham International Airport would have the potential to serve the aviation users at Arlington Municipal Airport, but they all have certain limitations. Dallas Executive and Fort Worth Spinks would need significant landside improvements to handle the amount of displacement from Arlington Municipal Airport. The same holds true for Fort Worth Meacham, as its location approximately 16 miles northwest of Arlington would be an inconvenience for those wanting to access the Arlington area.

Finally, Dallas Love Field would also have the ability to serve users of Arlington Municipal Airport, but its location well north of the area and its busy commercial service air traffic would not be a desired scenario when mixing with additional general aviation operations from Arlington.

If a shift of aviation services to any of these airports were pursued, current users of Arlington Municipal Airport would be forced to travel to a more distant and less convenient airport. Furthermore, the continuing growth expected in the Arlington area, plus the addition of the Dallas Cowboys National Football League franchise and other major business enterprises, demonstrates the need for a highly functional and convenient airport.

General aviation airports play a major role in the way companies conduct their business. These airports are becoming increasingly important in the post-9/11 aviation environment. Corporate aircraft use is becoming more affordable not only for businesses, but also for individuals. Arlington Municipal Airport is expected to accommodate business aircraft traffic for companies located or conducting business in the heart of the Metroplex. This role is not easily replaced by another existing airport in the system without tremendous expense and inconvenience.

CONSTRUCTION OF A NEW AIRPORT SITE

The alternative of developing an entirely new airport facility in the area to meet projected aviation demand was also considered. This alternative was similarly found to be unacceptable, primarily due to economic and environmental considerations. Land acquisition, site preparation, and the construction of a new airport near an urbanized area can be a very difficult and costly action. Closing the current Arlington Municipal Airport would mean the loss of a substantial investment in a sizeable transportation facility.

From social, political, and environmental standpoints, the commitment of a large land area must be considered. The public viewpoint toward new airports is generally negative, as a new airport typically requires the acquisition of several parcels of privately owned property. Furthermore, the development of a new airport similar to Arlington Municipal Airport would likely take a minimum of ten years to become a reality. The potential exists for significant issues to arise associated with its design and construction.

The only condition at which evaluating a new airport site would be considered feasible is if the current site becomes constrained or incapable of accommodating aviation demand. Arlington Municipal Airport has the potential for significant aviation expansion if needed. On the east side of the airfield, there are areas to the north and south of the terminal area that lend themselves well to future hangar development. The entire west side of the airport adjacent to the air traffic control tower (ATCT) also provides a large amount of area for future development. It is anticipated that the airport will not become so constrained as to prevent future growth through the long term planning period.

Overall, the non-development alternatives are considered unreasonable and should not be pursued at this time. Arlington Municipal Airport is a valuable asset to the economic dynamics of the region, and it should be developed to the extent practical to maintain and promote commerce in the area.

The previous chapter identified facilities necessary to meet the forecast demand throughout the planning period. The purpose of the remainder of this chapter is to evaluate alternatives that meet the needs of the airport. Necessary facility and airport design issues are examined in the discussion to follow.

AIRFIELD ISSUES

A commitment to remain at the existing location and develop facilities sufficient to meet the long term aviation demands entails the following requirements:

- Provide sufficient airside and landside capacity to meet the long range planning horizon demand levels of the area.

- Develop the airport in accordance with the currently established Federal Aviation Administration (FAA) and Texas Department of Transportation (TxDOT) criterion.

Chapter Three – Airport Facility Requirements outlined specific types and quantities of facilities necessary to meet projected aviation demands throughout the planning period. Expansion will be required to meet the long range planning horizon level of demand. The remainder of this chapter will describe various alternatives for the airside and landside facilities. Before these alternatives are presented, however, it is necessary to discuss items which are factored into the development of the various alternatives. **Exhibit 4A** outlines alternative issues to be considered in this analysis.

RUNWAY

Analysis in the previous chapter indicated that Runway 16-34 provides adequate length for most general aviation aircraft. The current runway length, however, falls short of the requirements for many of the larger and faster business aircraft which frequent the airport. The analysis also considers an increasing trend of corporate aircraft operations at the airport throughout the long term planning period.

As presented in the previous chapter, Runway 16-34 is adequate to support a high percentage of the business jet fleet at 60 percent useful load. To accommodate 100 percent of the business jets weighing less than 60,000 pounds at 60 percent useful load, FAA design criterion calls for the runway to be approximately 6,200 feet long. Many of the aircraft that fall into this category, such as the Challengers, Hawkers, and some Learjets, have occasions when more than 6,200 feet of runway would be needed. Jet aircraft require longer take-off roll during hot and humid days, which prevail in Arlington during the summer months. Furthermore, forecast future demand at Arlington Municipal Airport indicates that the airport should strive to accommodate business jet operations up to and including those in aircraft reference code (ARC) C/D-III. Analysis for this category of aircraft, presented in the previous chapter, indicates that a runway length of 7,000 feet is needed to fully accommodate aircraft such as the Gulfstream family, as well as Boeing 727s and DC-9s that currently operate at the airport on an infrequent basis. As a result, alternative analysis will consider the possibility of extending Runway 16-34 to provide an optimal runway length of at least 7,000 feet of usable pavement.

Also discussed in Chapter Three – Airport Facility Requirements was the possibility of widening the runway. For ARC C/D-III aircraft, with maximum certified takeoff weights greater than 150,000 pounds, the FAA runway width standard is 150 feet. If the Boeing 727 and/or the Boeing Business Jet (BBJ) increasingly utilize the airport to the point of representing the critical aircraft, the runway may need to be widened. In addition, the runway pavement strength may also need to be increased to meet the needs of these heavily loaded aircraft.

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RUNWAY

- Consider Upgrade To ARC C/D-III FAA design criteria.
- Consider extending Runway 16-34 up to 7,000′ operational length.
- Land Acquisition.
- Analysis of improved instrument approach procedures.
- Evaluate impacts of safety area considerations.
- Consider increasing pavement strength to 120,000 pounds DWL.
- Consider widening runway to 150′.

TAXIWAYS

- Evaluate a full length west side parallel taxiway.
- Consider improving airport capacity through the use of high speed exit taxiways.
- Consider widening some taxiways to 50′.

LANDSIDE DEVELOPMENT

- Maximize available property for facility development.
- Identify locations for additional conventional, executive, and T-hangar development.
- Analyze current and future terminal building needs and locations.
- Identify locations for non-aviation development and revenue support methods.
- Consider alternative for west side development.

The capacity analysis presented in the previous chapter indicated that current annual aircraft operations have reached approximately 70 percent of the airport's annual service volume (ASV). Forecasted long term operations would approach 90 percent of the airport's ASV. The FAA suggests that airports should plan for improvements once annual aircraft operations reach 60 to 75 percent of the ASV. Once operations exceed 80 percent of the ASV, the planned improvements should be implemented.

The most beneficial capacity improvement would be to construct a parallel runway. The existing layout of the airport and adjacent land uses do not provide a realistic opportunity to implement a parallel runway or any other runway configuration. As a result, this option will not be considered further, but other capacity-related improvements to the airfield will be explored.

The alternatives analyses will be developed with specific attention paid to the reasonableness of implementation, both from a cost perspective as well as a feasibility perspective.

TAXIWAYS

Taxiways are the primary transport surfaces linked with the runway and its operation. Such surfaces include a parallel taxiway, entrance/exit taxiways, and connecting taxiways.

Taxilanes are those surfaces that would typically realize a lower level of aircraft activity because the taxilanes provide direct ingress/egress to a specific location or airport facility. An example of a taxilane would be the surface which links to a T-hangar complex, as not all aircraft will use the surface, only those traversing to and from the T-hangars.

FAA Advisory Circular (AC) 150/5300-13, Change 10, *Airport Design*, provides standards for taxiway object free areas (OFAs) surrounding the taxiway system. As discussed in the previous chapter, the taxiway OFA is based on the critical aircraft design group which will frequent that particular taxiway. Design standards for Airplane Design Group (ADG) II, aircraft with wingspans ranging from 49 feet to 79 feet, require the taxiway OFA to be 131 feet wide. Aircraft within ADG III, with wingspans from 79 feet to 118 feet, require a 186-foot-wide taxiway OFA. The taxilane OFA required for ADG II aircraft is 115 feet wide, and it increases to 162 feet wide for ADG III aircraft. Analysis of existing and future taxiway OFA will be provided in the airside alternatives to follow.

The current layout of the taxiway system at Arlington Municipal Airport is adequate from a functional standpoint. Runway 16-34 is supported by a full length parallel taxiway and seven entrance/exit taxiways. Parallel and entrance/exit Taxiway A is 45 feet wide, Taxiway D is 75 feet wide, and all other taxiways are 35 feet wide. FAA design criteria call for taxiways serving a critical aircraft in ADG II to be at least 35 feet wide. For aircraft in ADG III, the planned critical design aircraft category, the minimum taxiway width is 50 feet.

Runway and parallel taxiway separation standards consider both the critical aircraft and the instrument approach minimums. The current critical aircraft falls in ARC C-II and the current lowest approved visibility minimum is one mile. This combination necessitates a runway to taxiway centerline separation of 300 feet. The runway to taxiway separation design standard for aircraft in ARC C/D-III with lower than three-quarters of a mile approach visibility minimums is 400 feet. Arlington Municipal Airport meets this standard.

Earlier in this chapter, it was mentioned that projected annual aircraft operations will near the airport's annual service volume. Capacity improvements to the airport's taxiway system include the development of high speed exit taxiways. In addition, a parallel taxiway on the west side of Runway 16-34 should be planned to aid in the development of the west airfield area. Airfield alternatives to follow include these additional taxiway developments at the airport.

AIRFIELD DESIGN STANDARDS

Analysis in the previous chapter indicated that the critical aircraft at Arlington Municipal Airport is currently ARC C-II. It is forecast, however, that during the course of the planning period, the critical aircraft will transition to ARC C/D-III. With this transition comes some changes in FAA and TxDOT airport design standards. Of primary concern are the runway safety area (RSA), the object free area (OFA), and the runway protection zone (RPZ). The existing and future safety areas are presented on **Exhibit 4B**.

Runway Safety Area

The FAA defines the RSA as "*a defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway*." The RSA is an integral part of the runway environment. RSA dimensions are established in AC 150/5300-13, Change 10, *Airport Design*, and are based on the ARC of the critical design aircraft for the airport. The RSA is intended to provide a measure of safety in the event of an aircraft's excursion from the runway, by significantly reducing the extent of personal injury and aircraft damage during overruns, undershoots, and veer-offs. According to the AC, the RSA must be:

1) cleared and graded and have no potentially hazardous ruts, bumps, depressions, or other surface variations;

2) drained by grading or storm sewers to prevent water accumulation;

3) capable, under dry conditions, of supporting aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft; and

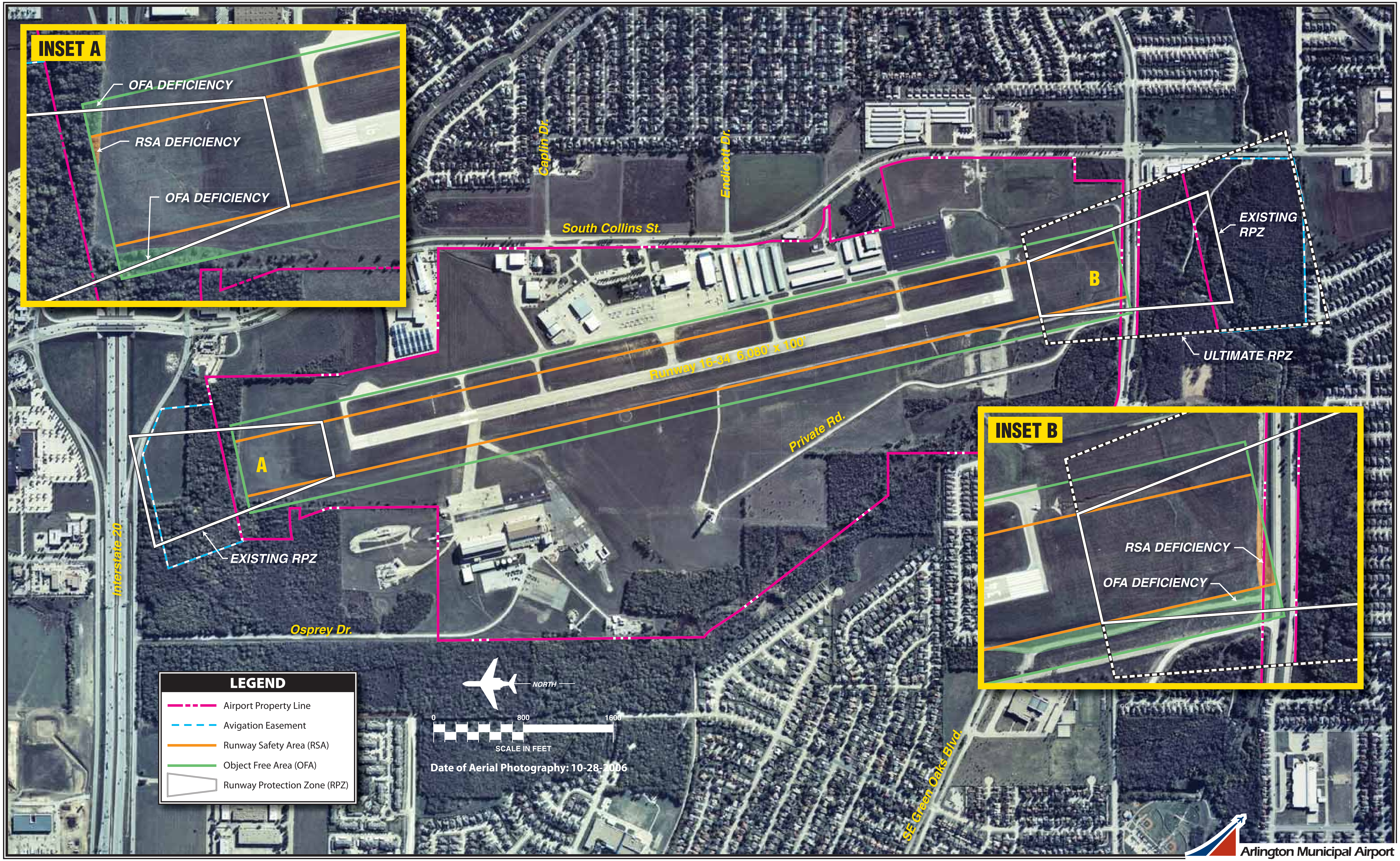

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Exhibit 4B
SAFETY AREAS

4) free of objects, except for objects that need to be located in the safety area because of their function.

Furthermore, the FAA has placed a higher significance on maintaining adequate RSAs at all airports due to recent aircraft accidents. Under Order 5200.8, the FAA established the Runway Safety Area Program. The Order states, "The goal of the Runway Safety Area Program is that all RSAs at federally-obligated airports and all RSAs at airports certificated under 14 CFR Part 139 shall conform to the standards contained in Advisory Circular 150/5300-13, *Airport Design*, to the extent practicable." Under the Order, each Regional Airports Division of the FAA is obligated to collect and maintain data on the RSA for each runway at federally-obligated airports.

In late 2004, a notable change to AC 150/5300-13, *Airport Design*, pertained to RSAs. Previously, the FAA required the same RSA on both ends of the runway, based on ARC of the critical aircraft. The new change recognizes different RSA measurements for take-off and landing. For ARC C/D-II aircraft, 600 feet of RSA is now required prior to the approach end of the runway, whereas 1,000 feet is still required beyond the far end of the runway. These standards apply to ARC C/D-III aircraft as well. Alternative analysis must consider providing adequate RSA, while also providing for additional runway length.

The required RSA for Runway 16-34 is 500 feet wide, extending 1,000 feet beyond each runway end. As depicted on **Exhibit 4B**, the majority of the RSA conforms to current FAA standards, however, there are a few portions that are obstructed. North of the runway, there is a small area of trees that serve as obstructions and a potential drainage ditch that may need improved grading to support emergency vehicles as well as occasional aircraft diversions from the runway. On the south side of the runway, the RSA extends approximately 80 feet off airport property. In this area, airport perimeter fencing and a portion of Southeast Green Oaks Boulevard obstruct the RSA.

It should be noted that a localizer and glideslope are being installed at Arlington Municipal Airport in 2007, as part of the Instrument Landing System (ILS) precision instrument approach to Runway 34. As a result, the RSA obstructions on the north end of the runway will be improved.

The RSA obstruction off the south end of the runway has been discussed in the past with FAA and TxDOT personnel. At the time, there was discussion of whether or not to provide an 80-foot displaced threshold on Runway 34, in an effort to provide a full 1,000-foot RSA. According to documentation, the FAA recommended that the threshold remain in its current location to prevent impacts with the precision obstacle free zone (POFZ) and aircraft holding short of the runway, and that there was an acceptable level of safety regarding this area. Since this time, the RSA required prior to the approach end of the runway has been reduced to 600 feet. The reduced RSA requirement results in the existing condition conforming to FAA standard for approach RSA. Further examination regarding the RSA obstruction off the south end of the runway will be provided in the alternatives analysis.

Object Free Area

The runway OFA is defined in FAA Advisory Circular 150/5300-13, Change 10, *Airport Design*, as an area centered on the runway extending laterally and beyond each runway end, in accordance to the critical aircraft design category utilizing the runway. The OFA must provide clearance of all ground-based objects protruding above the RSA edge elevation, unless the object is fixed by function serving air or ground navigation. For ARC C/D-II design, the OFA is 800 feet wide, extending 1,000 feet beyond each runway end. These same standards apply to ARC C/D-III aircraft as well.

The OFA at the north end of the runway, similar to the RSA, is obstructed, although even more significantly. The northeast and northwest portions of the OFA are obstructed by trees. Also, the OFA at the south end of the runway extends off airport property onto Southeast Green Oaks Boulevard. As mentioned earlier, the OFA obstructions off the north end of the runway will be corrected when the localizer is installed. The alternatives section to follow will address the OFA obstruction at the south end of the airport. It should be noted that, in some cases, the terrain encompassing the OFA may fall significantly below the RSA elevation. In those cases, objects can be in the OFA as long as they do not rise above the elevation of the RSA at any given lateral position.

Runway Protection Zone

The RPZ is a trapezoidal surface which begins 200 feet from the runway threshold. The RPZ is a designated area beyond the runway end that the FAA encourages airports to own or, in some fashion, maintain positive control over the types of land uses within the RPZ. The goal of the RPZ standard is to increase safety for both pilots and people on the ground. Unlike the RSA, the RPZ can have objects located within its boundaries, provided the objects are not obstructions under Title 14 of the Code of Federal Regulations (CFR) Part 77, *Objects Affecting Navigable Airspace* or FAA Order 8260.3B, *Terminal Instrument Procedures* (TERPS). It should be noted, however, that the FAA places high priority on maintaining the RPZ free of items that attract groupings of people or permanent residences.

The FAA does not necessarily require the fee simple acquisition of the RPZ area, but highly recommends that the airport have positive control over development within the RPZ. It is preferred that the airport owns the property; however, avigation easements (ownership of airspace within the RPZ) can be pursued if fee simple purchase is not possible. It should be noted, however, avigation easements can often cost as much as 80 percent of the full property value and may not adequately prohibit incompatible land uses from locating in the RPZ. An avigation easement would include the space below the approach surface and within the RPZ. For planning purposes, where feasible, alternatives will assume fee simple acquisition of the RPZ and land on either end of the runway not currently encompassed by the existing property line.

The existing RPZ for Runway 16 extends beyond airport property, nearing Interstate 20 to the north. The northeast portion actually extends across the outer road and exit for Interstate 20. A large majority of the RPZ that is located off airport property is controlled through an avigation easement, as shown on **Exhibit 4B**. Any proposed runway extension to the north will shift the RPZ across Interstate 20 and into areas currently occupied by existing facilities. As previously mentioned, the FAA strongly encourages keeping the RPZ as clear as possible or, at a minimum, over areas with compatible land uses. The alternatives section will go into more detail on the types of businesses that are located in these areas.

The current RPZ for Runway 34 extends across Southeast Green Oaks Boulevard. Airport property also extends across the road and, therefore, most of the RPZ is contained inside airport property. When approach minimums are improved with the installation of an ILS precision approach, the RPZ for Runway 34 will grow significantly. An avigation easement that is already in place will help control the RPZ, except for the extreme southeast and southwest corners. Moreover, the majority of land in the expanded RPZ is a City-owned and maintained park. As such, the City directly controls the use of this area.

INSTRUMENT APPROACHES

Arlington Municipal Airport currently has published straight-in, non-precision instrument approaches that serve Runway 34. These include a VOR/DME approach and an RNAV (GPS) approach. As mentioned in the previous chapter, Runway 16 does not have a straight-in instrument approach procedure, and it is unlikely that it will be served by one due to the proximity and airspace of DFW International Airport to the north.

Many reliever airports have approved instrument approaches with visibility minimums as low as one-half mile and 200-foot cloud height ceilings. This is referred to as a Category (CAT) I approach. A CAT I approach requires a sophisticated approach lighting system, a glideslope antenna, and a localizer (known as an instrument landing system or ILS).

Runway 34 at Arlington is currently being planned for an ILS precision approach. The localizer and glideslope will be installed in 2007, and a medium intensity approach lighting system with runway alignment indicator lights (MALSR) is planned to be installed in 2008. These components will make the runway available for a CAT I approach, however, an obstruction-free threshold siting surface (TSS) is required to meet FAA standards for this CAT I approach. The

FAA has already developed the ILS approach procedure and is awaiting the ILS installation to publish the approach.

The existing approaches to Runway 34 could also benefit from the addition of an approach lighting system; in this case, a MALSR. Visibility minimums may be reduced below the one mile limit that currently exists for the VOR/DME approach and RNAV (GPS) approach.

AIRFIELD ALTERNATIVES

The following section describes six airfield development alternatives. Within these alternatives, there are three different runway extension scenarios plus options for addressing the RSA deficiency off the south end of the runway. Also considered are taxiway improvements to include a westside parallel taxiway and capacity-enhancing high-speed exits, as well as improved instrument approaches and approach lighting aids.

AIRFIELD ALTERNATIVES 1A & 1B

Airfield Alternatives 1A and 1B, depicted on **Exhibit 4C**, consider the extension of Runway 16-34 700 feet to the north, achieving a total pavement length of 6,780 feet. This length will accommodate the majority of aircraft operating at Arlington Municipal Airport. It does, however, fall short of the projected 7,000 feet needed to better accommodate aircraft weighing more than 60,000 pounds, such as the Gulfstream business jets and DC-9 cargo jets, which operate at Arlington Municipal Airport on an occasional basis.

The proposed RSA, OFA, and RPZ would all extend beyond the current property boundary, necessitating land acquisition to the north. The total area of land outside the property line but within the safety areas is approximately 29 acres. The RSA and OFA combined include 11 acres. These areas containing the RSA and OFA would need to be cleared of trees and any other obstructions that could negatively affect the operation of aircraft and/or emergency response vehicles. At a minimum, the airport would need to acquire the RSA and OFA areas outside the property line, but it is further recommended that the airport purchase property adjacent to the Interstate 20 highway system in addition to the RPZ to provide a larger safety and land use compatibility buffer.

Due to the nature of the land use within the proposed RPZ, which includes Interstate 20 and commercial development further north, it may not be financially feasible to purchase the land via fee simple acquisition. It is very expensive to buy businesses and relocate them. As mentioned earlier, the FAA places a high priority on maintaining an RPZ with little or no development and/or congestion. The proposed runway extension places the RPZ over portions of two parking lots that serve large commercial office buildings. It also extends over a portion of one of these buildings. At the very least, the airport should have positive control over what is developed

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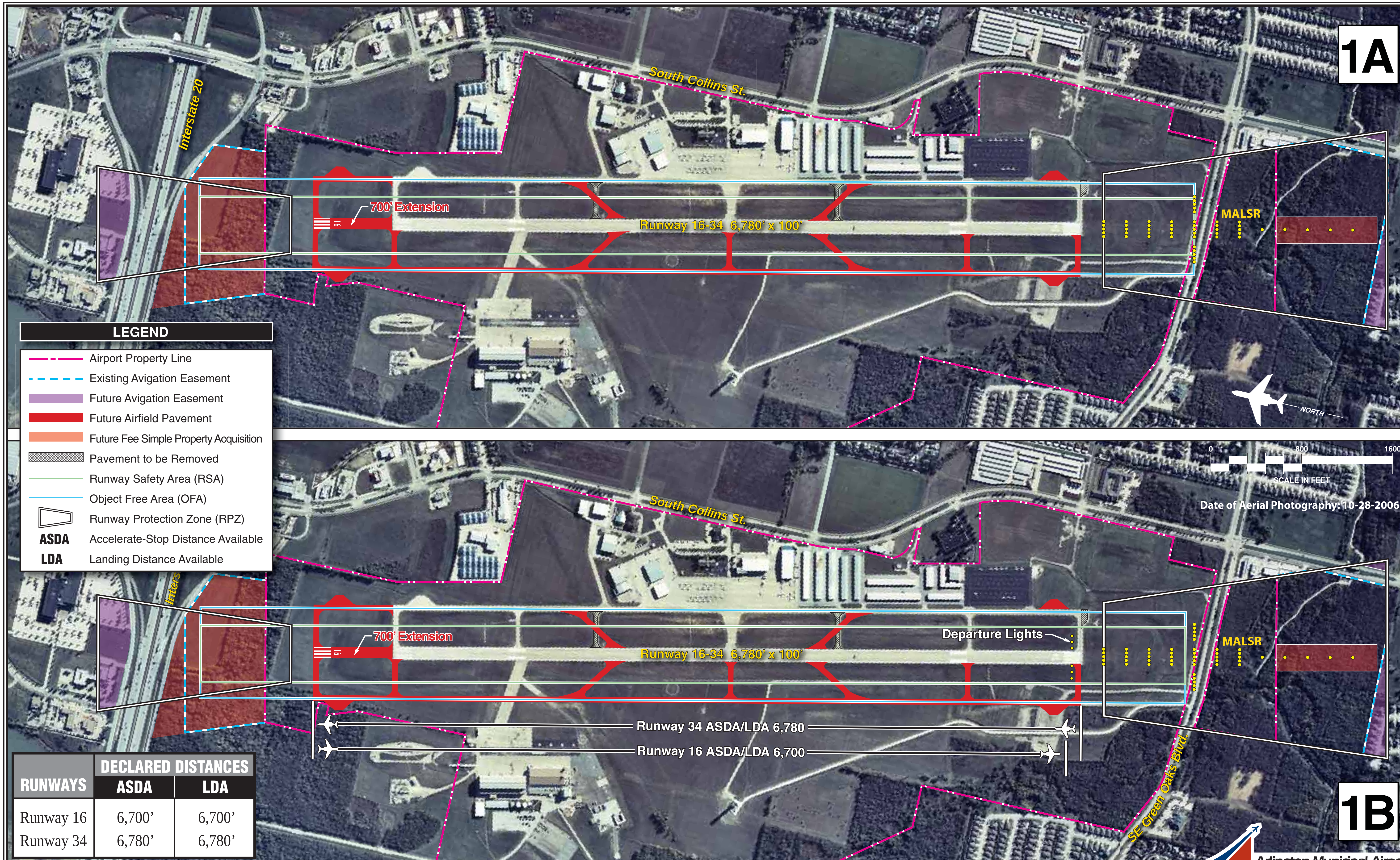

RUNWAYS	DECLARED DISTANCES	
	ASDA	LDA
Runway 16	6,700’	6,700’
Runway 34	6,780’	6,780’

Exhibit 4C
AIRSIDE ALTERNATIVE 1A & 1B

in the future within this area through the use of an avigation easement. The airport currently has existing avigation easements in place on the north and south ends of Runway 16-34. Any extension of the runway to the north would warrant expanding the avigation easement to help protect the RPZ.

Likewise, with the onset of improved instrument approach procedures to Runway 34 (ILS), the proposed RPZ will expand further south as a result of the lowered visibility minimums. As indicated on **Exhibit 4C**, the RPZ for Runway 34 considers providing CAT I visibility minimums. An avigation easement is currently in place that will cover all areas of the proposed RPZ except for the southeast and southwest corners, which are located over South Collins Street and a residential neighborhood. The approach lighting system will require a MALSR, which is planned for installation in 2008. The MALSR lights begin approximately 200 feet from the runway threshold and are spaced to a maximum distance of 2,400 feet, as indicated on the exhibit. The FAA requires that the airport own property within 100 feet on either side of the MALSR extending 200 feet from the end. With this being said, approximately 4.4 acres of land are shown as property acquisition to protect the MALSR. This area is currently owned by the City of Arlington. It should also be noted that the MALSR is depicted on all airside alternative exhibits to provide a general layout of what the system may look like. Further analysis separate from this Master Plan will determine the exact location of the approach lighting system.

The RSA deficiency at the south end of the runway, discussed earlier in this chapter, is not fully mitigated in Alternative 1A. Alternative 1A assumes that the existing RSA condition to the south could be found to meet standard to the extent practicable as provided in FAA Order 5220.8 and that no further improvements would be needed.

While Alternative 1A depicts a usable 6,780 feet of total runway length, Alternative 1B proposes to solve the RSA obstruction on the south end of the runway, by limiting the amount of usable length on Runway 16 through the use of declared distances. As discussed, the previous RSA standard required 1,000 feet prior to the approach end of the runway and beyond the far end of the runway for critical aircraft in ARC C/D-II and ARC C/D-III. In order to accommodate the previous RSA standard, the south end of the runway would need to be displaced by approximately 80 feet. Displacing the threshold for limited RSA requires the application of declared distances. Declared distances are the effective runway distances that the airport operator declares available for take-off run, take-off distance, accelerate-stop distance, and landing distance requirements. These are defined by the FAA as:

Take-off run available (TORA) – The length of runway declared available and suitable to accelerate from brake release to lift-off, plus safety factors.

Take-off distance available (TODA) – The TORA plus the length of any remaining runway or clearway beyond the far end of the TORA available to accelerate from brake release past lift-off to start of take-off climb, plus safety factors.

Accelerate-stop distance available (ASDA) – The length of the runway plus stopway declared available and suitable to accelerate from brake release to take-off decision speed, and then decelerate to a stop, plus safety factors.

Landing distance available (LDA) – The distance from threshold to complete the approach, touchdown, and decelerate to a stop, plus safety factors.

The ASDA and LDA are the overriding considerations in determining the runway length available for use by aircraft, because safety areas must be considered. The ASDA and LDA can be figured as the useable portions of the runway minus the area required to maintain adequate RSA and OFA beyond the end of the runway.

The new FAA standard calls for only 600 feet for RSA prior to landing. As a result, there is no need to displace the south end threshold for landing operations to Runway 34. In Alternative 1B, the operational length available for ASDA and LDA calculations utilizing Runway 34 would be 6,780 feet. The ASDA and LDA for Runway 16 take into account the need for the full 1,000-foot RSA beyond the runway end. Because there is approximately 80 feet of RSA obstructed on the south end, the ASDA and LDA for Runway 16 operations (take-offs and landings to the south) would be 6,700 feet.

Implementing declared distances would require some minor changes to the airfield. The last 80 feet of runway lights on the south end of the runway would have to be masked-out in order to properly identify the declared distances. The runway would not have to be re-marked, and none of the existing light stands would have to be moved.

Other airfield considerations taken into account with these alternatives include the development of a westside parallel taxiway to provide access for future aviation growth. As a safety consideration, the run-up apron on the south end of entrance/exit Taxiway A will be relocated to parallel Taxiway A further east, to avoid penetrations to the obstacle free zone (OFZ).

Also proposed are high-speed exit taxiways. Runway 16-34 is currently served by seven entrance/exit taxiways on the east side. All these taxiways are set at 90 degrees to the runway (right-angled). For airports highly utilized by turbine aircraft, high speed, or acute-angled exit taxiways aid in operational capacity. Consideration should then be given to the development of high-speed exits at Arlington Municipal Airport. High speed exits are typically situated at a 30-degree angle from the runway, exiting to the parallel taxiway. In most cases, they are developed for runways served by parallel taxiways with at least a 400-foot separation, which is the case at Arlington.

When all potential projects identified on Airfield Alternatives 1A and 1B are taken into consideration, a total associated cost of approximately $17.57 million is formulated. This includes $2.12 million for required land acquisition costs associated with the RSA and OFA, $750,000 for site preparations, $1.26 million for the extension of Runway 16-34, $795,000 for the extension of parallel Taxiway A on the east side of the runway, and $820,000 for the relocation of navigational aids. Also included in the overall cost is $2.77 million for recommended land acquisition to provide further safety enhancement of the airfield system, $1.27 million for recommended avigation easements within the north and south RPZs, and $7.78 million for the construction of high-speed taxiway exits and a full length parallel taxiway on the west side of the runway.

Advantages: The extension would provide a maximum of 6,780 feet operational length for take-offs and landings in both directions, which would accommodate the majority of aircraft utilizing Arlington. There is less land located within safety areas outside airport property than in alternatives to follow. This alternative will be less expensive than those to follow due to the shorter runway extension and smaller amount of land acquisition/avigation easements.

Disadvantages: The runway would not provide 7,000 feet for take-offs and landings in either direction.

AIRFIELD ALTERNATIVES 2A & 2B

A second option for accommodating airfield needs is to provide for a 1,000-foot northerly extension, as depicted in Airfield Alternatives 2A and 2B on **Exhibit 4D**. This extension would bring the total runway pavement length to 7,080 feet. This extension keeps with the new RSA standard requiring 600 feet prior to the landing threshold on Runway 16, thus allowing the runway to provide an ASDA and LDA of 7,080 feet. It should be noted, however, that only 700 feet of RSA and OFA would be provided to the north as proposed. Therefore, declared distances would be necessary to provide for full FAA RSA and OFA standards for aircraft operating on Runway 34. As discussed, the far end of the runway still needs to provide the full 1,000 feet of safety area. Thus, operations to the north would have available 300 feet less operational length due to the limited RSA and OFA provided off the north end of the runway. In effect, the northernmost 300 feet of runway combined with the proposed 700 feet of RSA and OFA provided beyond the runway extension end would provide the full 1,000-foot RSA needed for northerly operations. The RSA deficiency at the south end of the runway is not fully mitigated, as in Alternative 1A. It assumes that the existing RSA condition to the south could be found to meet standard to the extent practicable as provided in FAA Order 5220.8, and that no further improvements would be needed.

Alternative 2B takes into account the RSA obstruction on the south end of the runway, which was previously discussed. This limits the operational length of Runway 16 by approximately 80 feet. As a result, there is 7,000 feet

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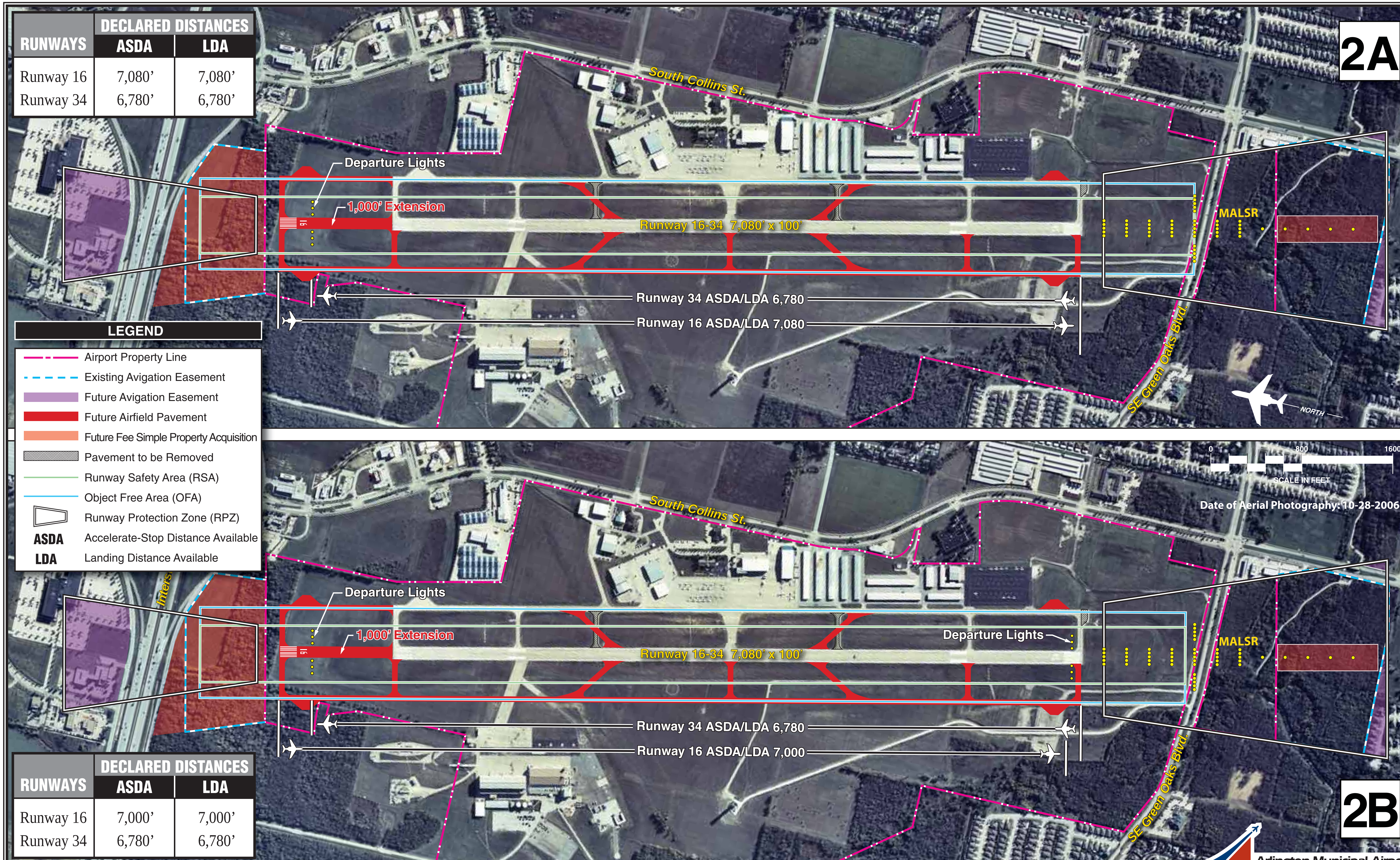

RUNWAYS	DECLARED DISTANCES ASDA	DECLARED DISTANCES LDA
Runway 16	7,080’	7,080’
Runway 34	6,780’	6,780’

RUNWAYS	DECLARED DISTANCES ASDA	DECLARED DISTANCES LDA
Runway 16	7,000’	7,000’
Runway 34	6,780’	6,780’

Exhibit 4D
AIRSIDE ALTERNATIVE 2A & 2B

of ASDA and LDA for Runway 16 operations, while Runway 34 would still provide an ASDA and LDA of 6,780 feet.

Just as in the previous alternatives, the RSA, OFA, and RPZ would all extend beyond the current airport property boundary. The total area of land outside the property line that encompasses the RSA and OFA is 11 acres, similar to what is shown on the previous exhibit. The RPZ extends further north to take into account the longer runway extension and encompasses approximately 23 acres of additional land off airport property. With this proposed runway extension, the RPZ extends over additional parking lot areas north of Interstate 20 and fully engulfs one commercial office building on the west side, while covering a portion of another building on the extreme northeast corner.

The improved instrument approach for Runway 34 is also considered here. The runway should be considered for a CAT I approach, while Runway 16 remains a visual runway due to the proximity of DFW International Airport to the north.

Airfield Alternatives 2A and 2B are each estimated to have a total associated cost of approximately $19.57 million. This includes $2.12 million for the purchase of property within the RSA and OFA, $750,000 for site preparations, $1.81 million for the extension of the runway, $1.01 million for the extension of eastside parallel Taxiway A, and $820,000 for the relocation of navigational aids. Other recommendations calculated into the overall cost include additional land acquisition totaling $2.77 million, avigation easements totaling $2.29 million, and the construction of high speed taxiway exits and a westside parallel taxiway totaling $8.00 million.

Advantages: This extension will provide, at a minimum, 7,000 feet of operational length for aircraft landing and departing Runway 16, which is the predominant runway used.

Disadvantages: The proposed RPZ would extend well north of Interstate 20 over existing and occupied office buildings. The desired 7,000 feet of operational length will not be obtained for northerly departures and landings.

AIRFIELD ALTERNATIVES 3A & 3B

Airfield Alternatives 3A and 3B provide the maximum runway length that is possible without the RSA and OFA penetrating the Interstate 20 highway system to the north of the airport. As depicted on **Exhibit 4E**, a 1,140-foot runway extension is proposed, increasing the total runway pavement length to 7,220 feet.

Alternative 3A proposes the full use of the 7,220 feet of runway length when operating on Runway 16. To allow for the full RSA standards, declared distances would factor into operational lengths on Runway 34, decreasing the amount of usable operational length by 400 feet. As such, Runway 34 would provide an ASDA and LDA of

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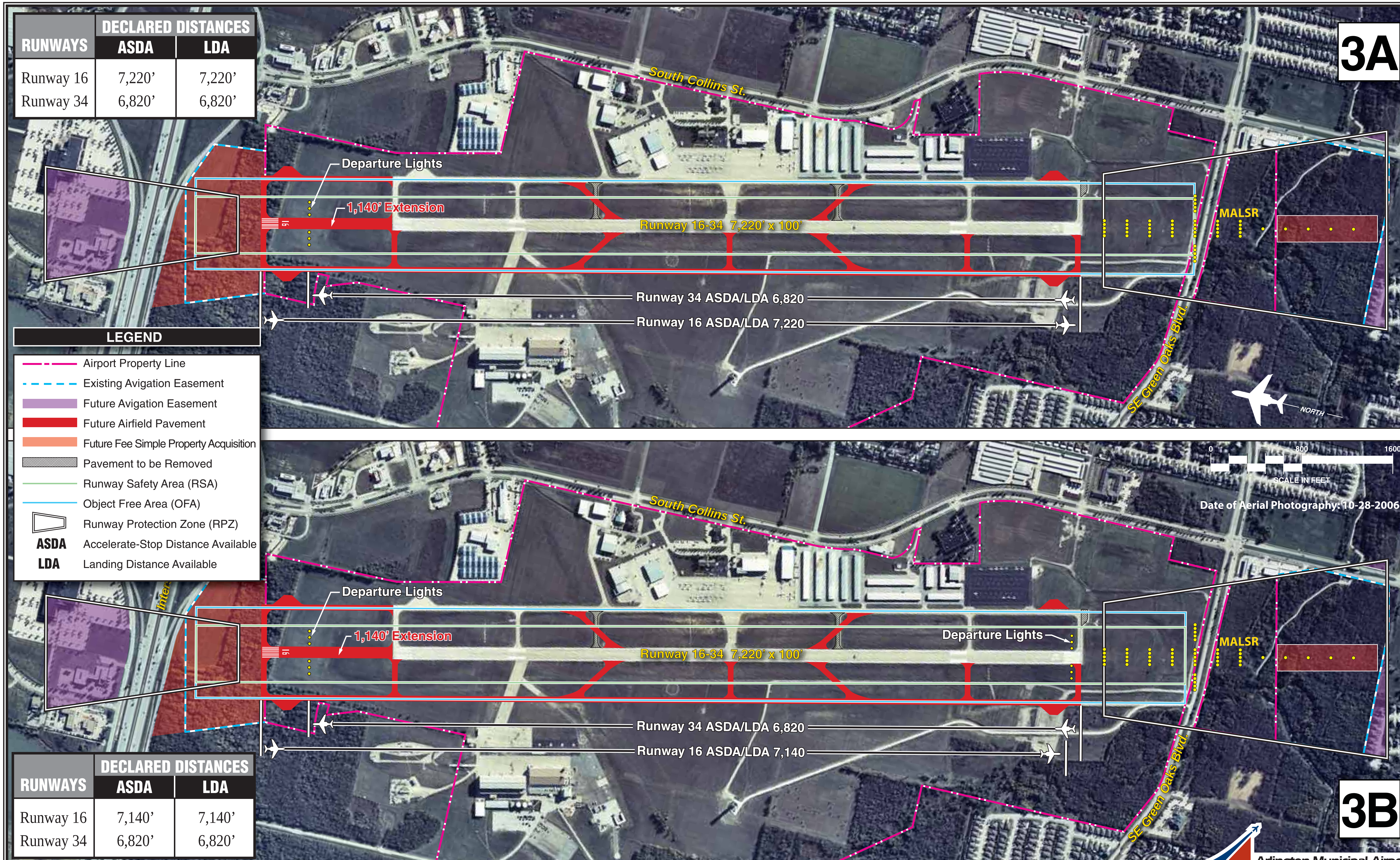


RUNWAYS	DECLARED DISTANCES	
	ASDA	LDA
Runway 16	7,220'	7,220'
Runway 34	6,820'	6,820'

RUNWAYS	DECLARED DISTANCES	
	ASDA	LDA
Runway 16	7,140'	7,140'
Runway 34	6,820'	6,820'

Exhibit 4E
AIRSIDE ALTERNATIVE 3A & 3B

6,820 feet. The obstruction to the southerly RSA is assumed to remain. Alternative 3B considers the 80-foot RSA obstruction on the south end of the runway. As a result, an ASDA and LDA of 7,140 feet would be declared for Runway 16 operations and 6,820 feet of pavement is declared available for operations on Runway 34.

Alternatives 3A and 3B propose the largest amount of safety area beyond the current property boundary. The RPZ for Runway 16 extends well north of Interstate 20, encompassing more commercial office buildings and parking lot areas. The amount of land that falls in the proposed RSA and OFA that would need to be acquired is approximately 11 acres, while the RPZ encompasses an additional 25 acres.

The RPZ for Runway 34 reflects a precision instrument approach with CAT I minimums. A full length parallel taxiway on the west side is shown again, as well as the addition of high-speed taxiway exits to improve the airport's capacity.

Airfield Alternatives 3A and 3B are each estimated to have a total associated cost of approximately $20.51 million. Of this total, approximately $6.86 million is associated with property acquisition, site preparations, navigational aid relocations, and actual construction of the runway and eastside parallel taxiway extensions. The remaining $13.65 million is associated with the purchase of additional property and avigation easements to further protect the airport environment, and the construction of taxiways to aid in the development of landside facilities and increased airport capacity.

Advantages: This extension would provide the maximum runway operational length for take-offs and landings in both directions given the constraints to the north and south.

Disadvantages: This alternative will be the most expensive due to the construction costs associated with site preparation and pavement for the runway/taxiway extension and the largest amount of property located within the extended runway safety areas. The proposed RPZ north of the airport extends over existing commercial land use areas.

OBSTRUCTION ANALYSIS

This section provides an examination of potential obstructions to the runway system at Arlington Municipal Airport. A key priority which needs to be considered is protecting the airport from the potential for flight obstructions. The FAA has established criteria aimed at protecting the airport from these flight obstructions. First, FAA criterion stipulates that obstructions not be placed too close to the runway ends or parallel to the runway. The obstruction clearance requirements are based on the ARC and/or weight of the critical aircraft, as well as the type of approaches established or planned for the airport. Minimum obstruction clearance is required for all runways, and it becomes more restrictive as the approaches progress from visual, to non-precision, to precision.

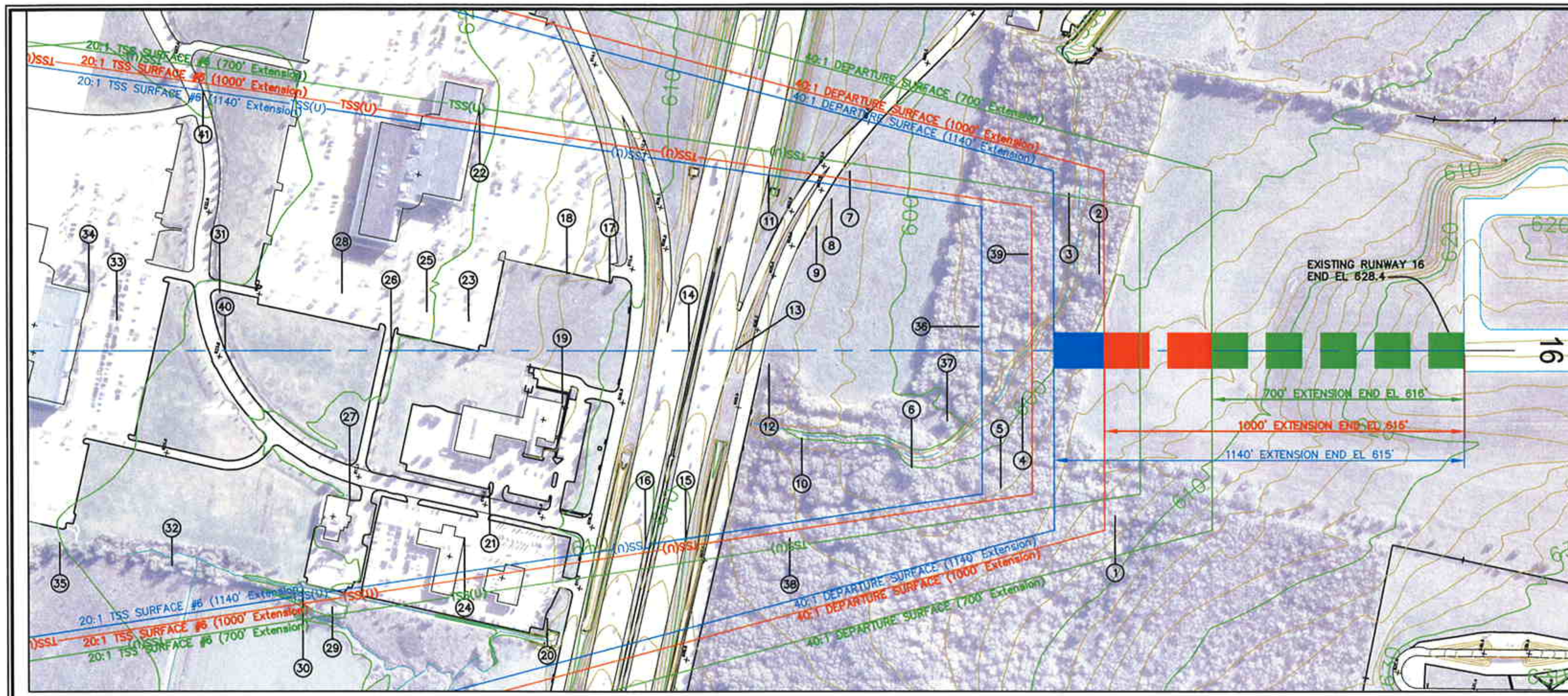
The three resources for determining airspace obstructions are the FAA's 14 CFR Part 77, *Objects Affecting Navigable Airspace*, *Terminal Instrument Procedures* (TERPS), and AC 150/5300-13, Change 10, *Airport Design*. Part 77 is more of a filter which identifies potential obstructions. The Threshold Siting Surface (TSS), defined in *Airport Design* and TERPS, are the critical surfaces considered by TxDOT and the FAA. If there is a penetration to the TSS slope, then action must be taken by the airport to eliminate the obstruction, otherwise the approved approaches to the airport can be removed. TERPS analysis is used to evaluate and develop instrument approach procedures including visibility minimums and cloud heights associated with approved approaches.

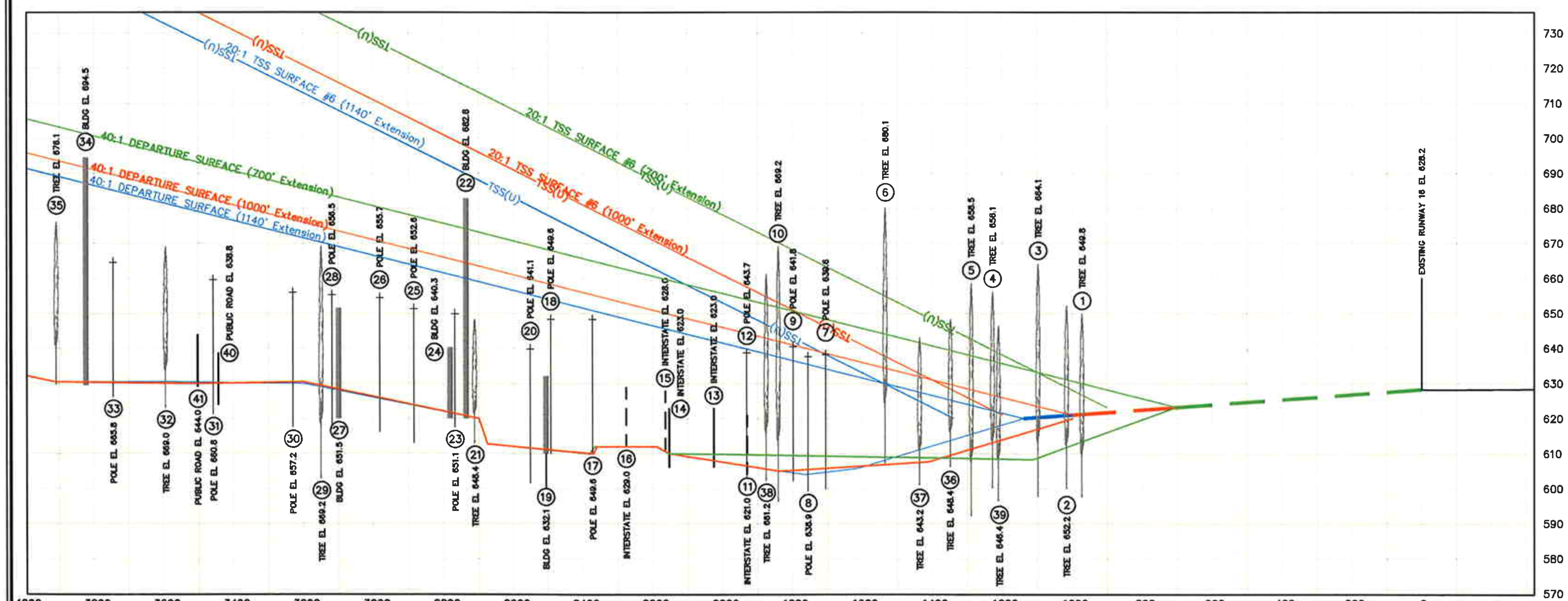
As previously discussed, Arlington Municipal Airport is in the process of implementing an ILS approach to Runway 34. In doing so, the FAA has conducted analysis of potential approach obstructions to this runway end as it developed the ILS instrument approach procedure. The following provides an obstruction analysis for the three potential runway extension alternatives previously discussed for Runway 16. Currently, this runway does not have an approved instrument approach procedure and it is unlikely that it will get one due to the proximity and airspace of DFW International Airport to the north. As a result, the dimensions of the TSS will reflect a visual-only approach to Runway 16.

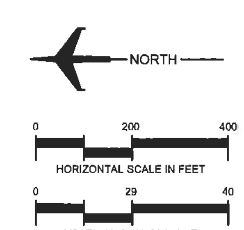
The dimensions of the existing TSS surface are described in AC 150/5300-13, Change 10, *Airport Design*. As stated in Appendix 2 of this AC, the TSS begins 200 feet from the runway threshold, is centered on the extended runway centerline and is 800 feet wide, which increases out to a width of 1,900 feet at a distance of 10,000 feet. This TSS must provide an obstacle clearance for a 20:1 approach slope. The dimensions of this TSS slope remain the same throughout the planning period.

Exhibit 4F presents airspace obstruction analysis for the proposed runway extensions north of Runway 16. The top portion of the exhibit displays the plan, or "overhead" view of each TSS. The bottom half of the exhibit depicts the profile view of the TSS conditions. The TSS slope associated with a 700-foot extension, 1,000-foot extension, and 1,140-foot extension is depicted.

All three proposed runway extensions show penetrations to the TSS. As expected, the longer the runway extension the more penetrations there are occurring. The 700-foot and 1,000-foot extension have several trees penetrating the 20:1 surface, while the 1,140-foot extension has even more trees at greater penetrating heights, plus a pole that penetrates the TSS by one foot. A large three-story commercial office building located north of Interstate 20 does not penetrate any of the TSS surfaces associated with each of the three extensions, but does come within approximately six feet of the 1,140-foot proposed extension's TSS. It should be noted that 14 CFR, Part 77, requires that additional elevation be added to roadways. In this case, 17 feet is applied to the Interstate 20







Ultimate Alternative Obstructions

700' Extension - Runway End El 623.0

No.	Object	Object Elevation	700' Extension TSS 20:1 Slope	Departure 40:1 Slope
1	TREE	649.8	23	20
2	TREE	652.2	24	22
3	TREE	664.1	31	31
4	TREE	656.1	17	20
5	TREE	658.5	16	21
6	TREE	680.1	25	36
7–9	VARIES	VARIES	CLEAR	CLEAR
10	TREE	669.2	CLEAR	17
11–21	VARIES	VARIES	CLEAR	CLEAR
22	BLDG	682.8	CLEAR	9
23–35	VARIES	VARIES	CLEAR	CLEAR
36	TREE	648.4	3	9
37	TREE	643.2	CLEAR	2
38	TREE	661.2	CLEAR	9
39	TREE	646.4	8	11
40–41	ROAD	VARIES	CLEAR	CLEAR

1000' Extension - Runway End El 621.0

No.	Object	Object Elevation	1000' Extension TSS 20:1 Slope	Departure 40:1 Slope
1	TREE	649.8	40	29
2	TREE	652.2	41	31
3	TREE	664.1	48	41
4	TREE	656.1	34	29
5	TREE	658.5	33	30
6	TREE	680.1	42	46
7	POLE	639.6	CLEAR	1
8	POLE	638.9	CLEAR	CLEAR
9	TREE	641.8	CLEAR	1
10	TREE	669.2	15	27
11	INTERSTATE	621.0	CLEAR	CLEAR
12	POLE	643.7	CLEAR	CLEAR
13–21	VARIES	VARIES	CLEAR	CLEAR
22	BLDG	682.8	CLEAR	18
23–33	VARIES	VARIES	CLEAR	CLEAR
34	BLDG	694.5	CLEAR	3
35	TREE	676.1	CLEAR	CLEAR
36	TREE	648.4	20	19
37	TREE	643.2	10	11
38	TREE	661.2	6	18
39	TREE	646.4	25	20
40–41	ROAD	VARIES	CLEAR	CLEAR

1140' Extension - Runway End El 620.0

No.	Object	Object Elevation	1140' Extension TSS 20:1 Slope	Departure 40:1 Slope
1	TREE	649.8	48	39
2	TREE	652.2	49	36
3	TREE	664.1	56	45
4	TREE	656.1	42	34
5	TREE	658.5	41	35
6	TREE	680.1	50	50
7	POLE	639.6	1	5
8	POLE	638.9	CLEAR	3
9	TREE	641.8	CLEAR	5
10	TREE	669.2	23	31
11	TREE	621.0	CLEAR	CLEAR
12	POLE	643.7	CLEAR	4
13–21	VARIES	VARIES	CLEAR	CLEAR
22	BLDG	682.8	CLEAR	23
23–33	VARIES	VARIES	CLEAR	CLEAR
34	BLDG	694.5	CLEAR	7
35	TREE	676.1	CLEAR	CLEAR
36	TREE	648.4	28	23
37	TREE	643.2	18	16
38	TREE	661.2	14	23
39	TREE	646.4	33	25
40–41	ROAD	VARIES	CLEAR	CLEAR

* ELEVATIONS ADJUSTED UPWARD 15' FOR PUBLIC ROAD, 17' FOR INTERSTATE HIGHWAY.

Arlington Municipal Airport

Exhibit 4F

OBSTRUCTION ANALYSES OF ALTERNATIVES

highway system to the north, but it does not create a TSS obstruction on any of the proposed runway extensions.

A departure surface is also shown for each of the three proposed runway extensions. As described in Appendix 2 of AC 150/5300-13, Change 10, *Airport Design*, the departure surface begins at the elevation at the departure end of the runway and slopes at 40:1. It is 1,000 feet wide at the runway end, and increases to a width of 6,466 feet at a distance of 10,200 feet. There are several obstructions that penetrate the departure surface as depicted on **Exhibit 4F**. The most significant permanent obstruction is the three-story commercial office building, which penetrates all three departure surfaces associated with each runway extension. The departure surface associated with the 1,000-foot and 1,140-foot runway extension is also obstructed by a second building located further north.

Ultimately, it is the FAA and their evaluation of the airspace surrounding Arlington Municipal Airport that will determine if any buildings or other structures will be obstructions to the ultimate airport design.

AIRFIELD ALTERNATIVES SUMMARY

The previous alternatives considered several methods which attempt to provide additional runway length in order to meet increased demand by larger jet aircraft, while also attempting to meet FAA and TxDOT airport safety design criteria.

Airfield Alternatives 1A and 1B provide 6,780 feet of runway pavement length. This length will satisfy the majority of aircraft utilizing Arlington Municipal Airport. Some larger corporate jets could be somewhat limited, especially during summer months when weather conditions are hot and humid. Further, if improvements to the RSA are taken into consideration on the south end, the Runway 16 ASDA and LDA would be reduced to 6,700 feet. The safety areas off the north end of the runway do extend beyond the current airport property line and there are obstruction penetrations to the TSS and departure surface, but to a lesser extent than the other alternatives.

Alternatives 2A and 2B show a 1,000-foot runway extension to the north, providing a total pavement length of 7,080 feet. After the safety area standards are met, ASDA and LDA declared distances are at least 7,000 feet for Runway 16. This length will better accommodate the larger corporate jets that operate in and out of the airport such as the Gulfstream family and Boeing 727 cargo aircraft. It is important to note that Runway 16 is the predominant operational flow due to local wind conditions. As such, it is beneficial to have Runway 16 providing a greater length. Runway 34 allows for an ASDA and LDA of 6,780 feet. Based on this scenario, the majority of airport operations will be provided at least 7,000 feet of operational length. The longer runway extension to the north also entails more safety area to be considered off airport property, especially regarding the RPZ.

Alternatives 3A and 3B call for the maximum runway extension that is possible at the airport. The 1,140-foot extension provides a 7,220-foot runway pavement length that will accommodate an array of jet aircraft, while providing additional buffer during times when the runway system is contaminated (water on pavement), and during hot and humid weather conditions when runway length available is most critical. As in the other alternatives, declared distances would be published which limit the operational length. Runway 16 would provide an ASDA and LDA of at least 7,140 feet, while Runway 34 would provide an ASDA and LDA of 6,820 feet. For a reliever airport such as Arlington Municipal Airport, it would be optimal for the operational length requirements of the runway to be met as close as possible in both directions, which is the case with Alternatives 3A and 3B. The safety areas off the north end of the runway do encompass the greatest amount of property to be controlled, whether through acquisition, easement, or a combination of both.

All alternatives consider the improved instrument approach procedures that will be taking place on Runway 34. A precision ILS approach will be implemented later this year and a MALSR is to be installed in 2008. This will increase the size of the existing RPZ on the south end of the airport, moving it further outside the airport property boundary.

As discussed, the capacity of the airport is likely to become an issue by the short term of the plan. High-speed taxiway exits are planned to the runway system to help alleviate this potential constraint. A full length parallel taxiway is also depicted on all alternatives in an effort to open up available space for aviation development on the west side of the airport.

The cost of each proposed runway extension increases as the amount of runway length provided increases. **Table 4A** provides a more detailed breakdown of costs associated with the three proposed runway extensions as previously discussed under each airfield alternative.

Implementation of any of the alternatives results in similar environmental impacts. The potential wetland area north of the airport would be impacted as portions of the wetland would need to be filled to allow for the extended runway's OFA. Installation of the MALSR would impact wetland and floodplain resources associated with Fish Creek south of the airport. The MALSR would also be placed in close proximity to Fish Creek Linear Park, a potential Section 4(f) resource. Both these projects would also impact wooded areas north and south of the airport, which would need to be surveyed for biological or cultural resources.

TABLE 4A Airside Alternative Cost Projections Arlington Municipal Airport			
Project	**Alternative 1A & 1B**	**Alternative 2A & 2B**	**Alternative 3A & 3B**
Runway Extension			
Required Fee Simple Land Acquisition (RSA and OFA)	$2,124,000	$2,124,000	$2,124,000
Site Preparation	$750,000	$750,000	$750,000
Runway Extension	$1,264,000	$1,806,000	$2,058,000
Eastside Parallel Taxiway Extension	$795,000	$1,011,000	$1,112,000
Relocate Localizer	$750,000	$750,000	$750,000
Relocate Navaids (PAPI and REIL)	$70,000	$70,000	$70,000
Subtotal	**$5,753,000**	**$6,511,000**	**$6,864,000**
Taxiways			
Westside Parallel Taxiway	$6,341,000	$6,558,000	$6,659,000
High Speeds - East	$722,500	$722,500	$722,500
High Speeds – West	$722,500	$722,500	$722,500
Subtotal	**$7,786,000**	**$8,003,000**	**$8,104,000**
Safety Enhancements			
Recommended Land Acquisition (North End)	$2,765,000	$2,765,000	$2,765,000
Avigation Easements (North and South End)	$1,266,000	$2,292,000	$2,773,000
Subtotal	**$4,031,000**	**$5,057,000**	**$5,538,000**
Total Costs	**$17,570,000**	**$19,571,000**	**$20,506,000**

LANDSIDE ISSUES

The orderly development of the airport terminal area, those areas along the flight line parallel to the runway, can be the most critical, and often times the most difficult to control on the airport. A development approach of taking the path of least resistance can have a significant effect on the long-term viability of an airport. Allowing development without regard to a functional plan could result in a haphazard array of buildings and small ramp areas, which will eventually preclude the most efficient use of valuable space along the flight line.

Activity in the terminal area should be divided into high, medium, and low intensity levels at the airport. The **high-activity** area should be planned and developed to provide aviation services on the airport. An example of the high-activity area is the airport terminal building and adjoining aircraft parking apron, which provides tie-down locations and circulation for aircraft. In addition, large conventional hangars used for fixed base operators (FBOs), corporate aviation departments, or storing a large number of aircraft would be considered a high-activity use area. The best location for high-activity areas is along the flight line near midfield, for ease of access to all areas of the airfield.

The **medium-activity** use category defines the next level of airport use and primarily includes smaller corporate aircraft that may desire their own executive hangar storage on the airport. The best location for medium-activity use is off the immediate flight line, but still readily accessible to aircraft including corporate jets. Due to an airport's layout and other existing conditions, if this area is to be located along the flight line, it is best to keep it out of the midfield area of the airport, so as to not cause congestion with transient aircraft utilizing the airport. Parking and utilities such as water and sewer should also be provided in this area.

The **low-activity** use category defines the area for storage of smaller single and twin-engine aircraft. Low-activity users are personal or small business aircraft owners who prefer individual space in T-hangars. Low-activity areas should be located in less conspicuous areas. This use category will require electricity, but generally does not require water or sewer utilities.

Ideally, terminal area facilities at general aviation airports should follow a linear configuration parallel to the primary runway. The linear configuration allows for maximizing available space, while providing ease of access to terminal facilities from the airfield. Each landside alternative will address development. Separation of activity levels and efficiency of layout will be provided as well.

In addition to the functional compatibility of the terminal area, the proposed development concept should provide a first-class appearance for Arlington Municipal Airport. As previously mentioned, the City of Arlington, located in the heart of the Dallas / Fort Worth Metroplex, serves as a very important link to the entire region whether it is for business or pleasure. This location is already home to many major corporate and manufacturing businesses, plus the Texas Rangers Major League Baseball franchise. When one considers the significant population growth of the area and the future home of the Dallas Cowboys National Football League franchise, it is easy to see how the City of Arlington will continue as a very important location to the surrounding area. Consideration to aesthetics should be given high priority in all public areas, as the airport can serve as the first impression a visitor may have of the community.

Arlington Municipal Airport is located on approximately 500 acres. In order to allow for maximum development of the airport while keeping with FAA mandated safety design standards, it is very important to devise a plan that allows for the orderly development of airport facilities. Typically, general aviation airports will reserve the first 1,000 feet parallel to the runway for aviation-related activity exclusively. This distance will allow for the location of taxiways, apron, and hangars. The eastside property line varies from approximately 600 feet to 1,500 feet from the runway centerline, while the westside property line provides between 1,400 and 2,000 feet of separation in areas most suitable for development.

Arlington Municipal Airport is projected to continue as a thriving general aviation airport in the Dallas/Fort Worth Metroplex. It is important to factor in not only the projected demand levels the airport is forecasted to experience, but also one-time events that could produce a large volume of traffic. The City is actively pursuing the National Football League's biggest event of each year, the Super Bowl. Due to the nature of this game, it can be expected that a large number of corporate jets would operate at the airport, with even more people utilizing the terminal building and fixed base operators (FBOs). The landside alternatives that will be presented in the next section take into consideration the need for maximum apron space to handle a large number of aircraft and options regarding the location of a new airport terminal building.

In those circumstances where ultimate demand levels fall short of the ultimate build-out need, some airports will encourage non-aviation commercial or industrial development. The potential of non-aviation development on airport property can provide an additional revenue source in the form of long-term land leases for the airport. Aviation-related growth is forecasted to be very strong at Arlington Municipal Airport throughout the planning period, thus, the majority of property on the airport will be dedicated for aviation use. There is some consideration in one of the following alternatives given to the possibility of commercial/industrial landside development on the west side of the airport.

LANDSIDE ALTERNATIVES

The following section describes three landside development alternatives. These alternatives consider general aviation facility development providing for separation of activity levels. The goal of this analysis is to indicate development potentials which would provide the City of Arlington with a specific goal for future development. The resultant plan will aid the City in strategic marketing of available airport properties. The following development alternatives analysis utilizes accepted airport planning methodologies in conjunction with FAA AC 5300/13, Change 10, *Airport Design*.

The three alternatives to be presented are not the only options for development. In some cases, a portion of one alternative could be intermixed with another. Also, some development concepts could be replaced with others. The final recommended plan only serves as a guide for the City. Many times, airport operators change their plan to meet the needs of specific users. The goal in analyzing landside development alternatives is to focus future development so that airport property can be maximized.

Each of the landside alternatives presented reflects the ultimate build-out potential for the airport on existing airport property. What is presented exceeds the aviation needs forecast over the next 20 years. This analysis is designed to provide a planned ultimate direction for airport development. Staging of the development to meet demand-based indicators as well as comprehensive financial plans will be presented in Chapter Six, once the final master plan concept is determined.

There are four areas which will be given specific attention for planned development. The first is the existing flight line and terminal area. The second is the area directly north of the existing terminal area. The third area is east and south of the existing aircraft parking apron located toward the south end of the airport. The fourth area is on the west side of the airport, adjacent to the existing air traffic control tower (ATCT). Although full development on the west side of the airport is likely a long-term vision, proper planning now will ensure that this valuable airfield space is properly developed when demand warrants. It is very likely, however, that development in the west area will be required in the near future to meet growing demand.

LANDSIDE ALTERNATIVE A

Landside Alternative A, depicted on **Exhibit 4G**, considers all future development will take place inside the existing airport property line. The principal philosophy followed is to group facilities supporting similar activity levels together.

This alternative proposes a new terminal building location east of the existing building location, nearer South Collins Street. As mentioned earlier, the Arlington Municipal Airport can expect an increase in aircraft traffic through the planning period, especially in the form of corporate jet traffic. In order to accommodate this forecast increase, additional aircraft parking apron space will be needed. Providing a new terminal location to the east adjacent to South Collins Street not only increases the apron space as depicted on the exhibit, but continues to allow convenient access for passengers to enter/exit the airport. In doing so, the terminal building would still remain in a central location on the airport, which is desired. Keeping in the terminal area, another hangar is proposed to be built just east of an existing FBO hangar, making for optimal utilization of otherwise vacant property.

This alternative also proposes changes to be made in the area of existing City-owned T-hangar facilities. Currently, there are five separate T-hangar complexes that provide for 96 individual aircraft storage spaces in this area. This concept removes the T-hangars and replaces them with four conventional style hangars for FBO operations, aircraft storage, and additional ramp apron space. An additional hangar is shown to be built on available land just south of this location.

If this alternative were to be implemented, additional T-hangar complexes would need to be constructed in order to accommodate those that were removed. The area on the southeast side of the airport could support significant T-hangar development, as depicted, that will accommodate T-hangar relocations plus additional demand. It may be possible to physically relocate the existing T-hangar complexes to this area, depending on their current condition, in an effort to decrease costs associated with purchasing materials to construct.

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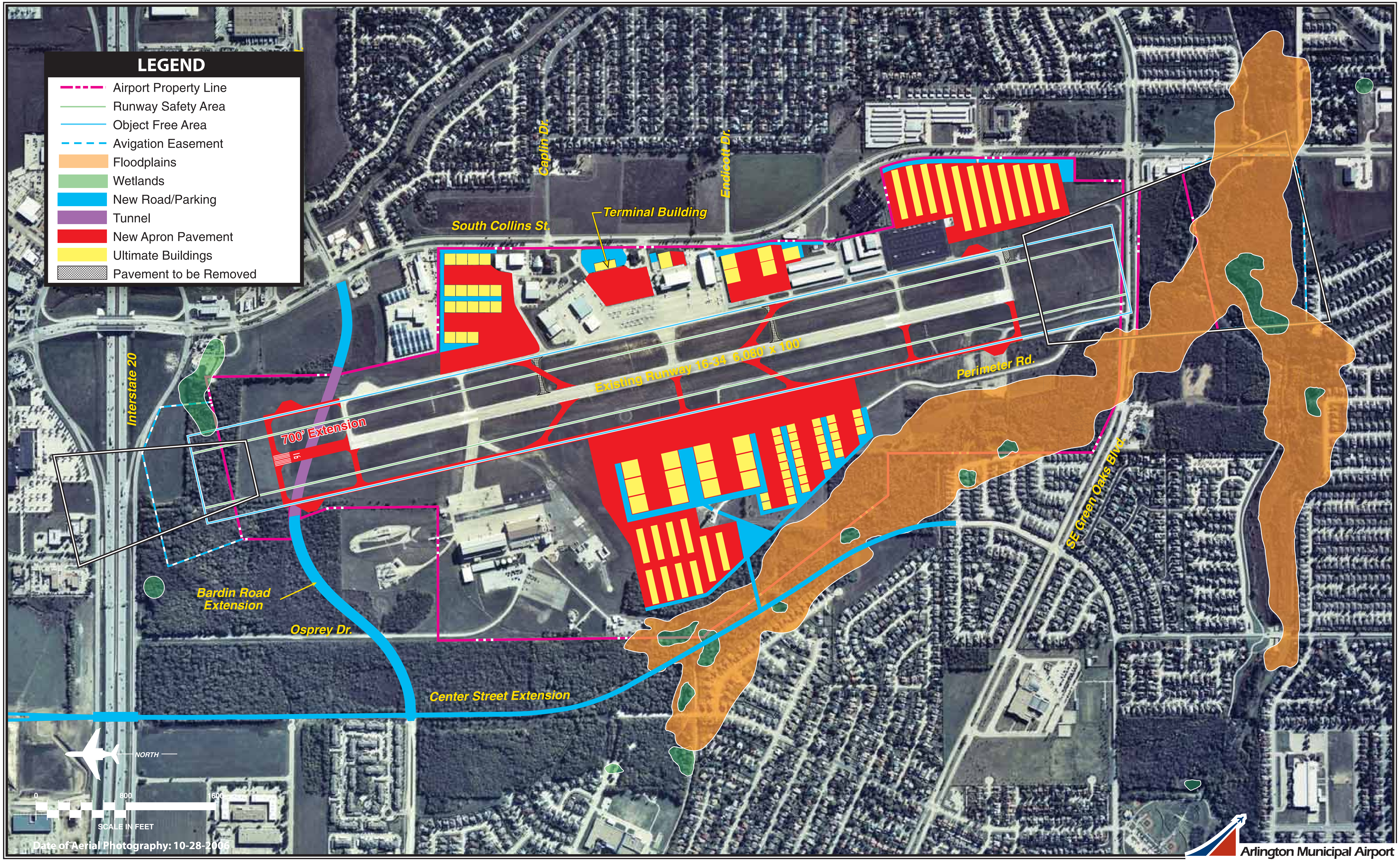

Exhibit 4G
LANDSIDE ALTERNATIVE A

To the north of the terminal area is land designated for executive hangar development. Additional apron space is also provided to accommodate transient aircraft in the event that the terminal parking areas were occupied.

The above describes maximum development potential on the east side of the airport within the current property boundary. In order to fully utilize all areas of the airport, analysis was conducted on the west side of the airfield as well. The City has preliminary plans to extend two roadways adjacent to the airport. As depicted on **Exhibit 4G**, Bardin Road will be extended west from South Collins Street, tunneled underneath the airport, reappearing just north of Bell-Helicopter Textron's facility. Center Street will then extend from north of Interstate 20 south to create improved access to the west side of the airport. Currently, there is controlled access to the west side of the airport through an airport perimeter road extending off Southeast Green Oaks Boulevard used only by airport, ATCT, and FAA personnel.

In keeping with the philosophy of grouping similar activity levels together, this alternative proposes hangar development surrounding the existing ATCT. Large conventional hangar facilities are depicted near the flight line that will accommodate FBO-type operations, with smaller executive hangars to the south that will accommodate corporate flight departments. To the west, set back from the proposed flight line, are several T-hangar complexes to accommodate smaller aircraft storage.

The proposed development areas discussed in this alternative will need to be analyzed and studied in more detail before ever coming to fruition. As with any development, areas on the north, south, and west sides that show future hangar facilities will have to take into account specific site preparation methods regarding grading and drainage.

Advantages: It provides the largest amount of aircraft parking apron space with the proposed location of the new terminal building. Proper separation of aviation activity levels is considered on the east and west sides of the airfield.

Disadvantages: The removal and relocation of City-owned T-hangar complexes could present a logistical problem and could be rather costly. Additional T-hangars would need to be constructed in order to accommodate those tenants in the City-owned T-hangars.

LANDSIDE ALTERNATIVE B

Landside Alternative B considers two different terminal building locations. The first option, as depicted on **Exhibit 4H**, would be located just north of the existing terminal building facing the northwest. Directly behind it are two proposed conventional hangars atop the existing terminal building. To the east, another hangar is shown with additional apron space provided for aircraft access.

The second option places the terminal building farther south along the flight

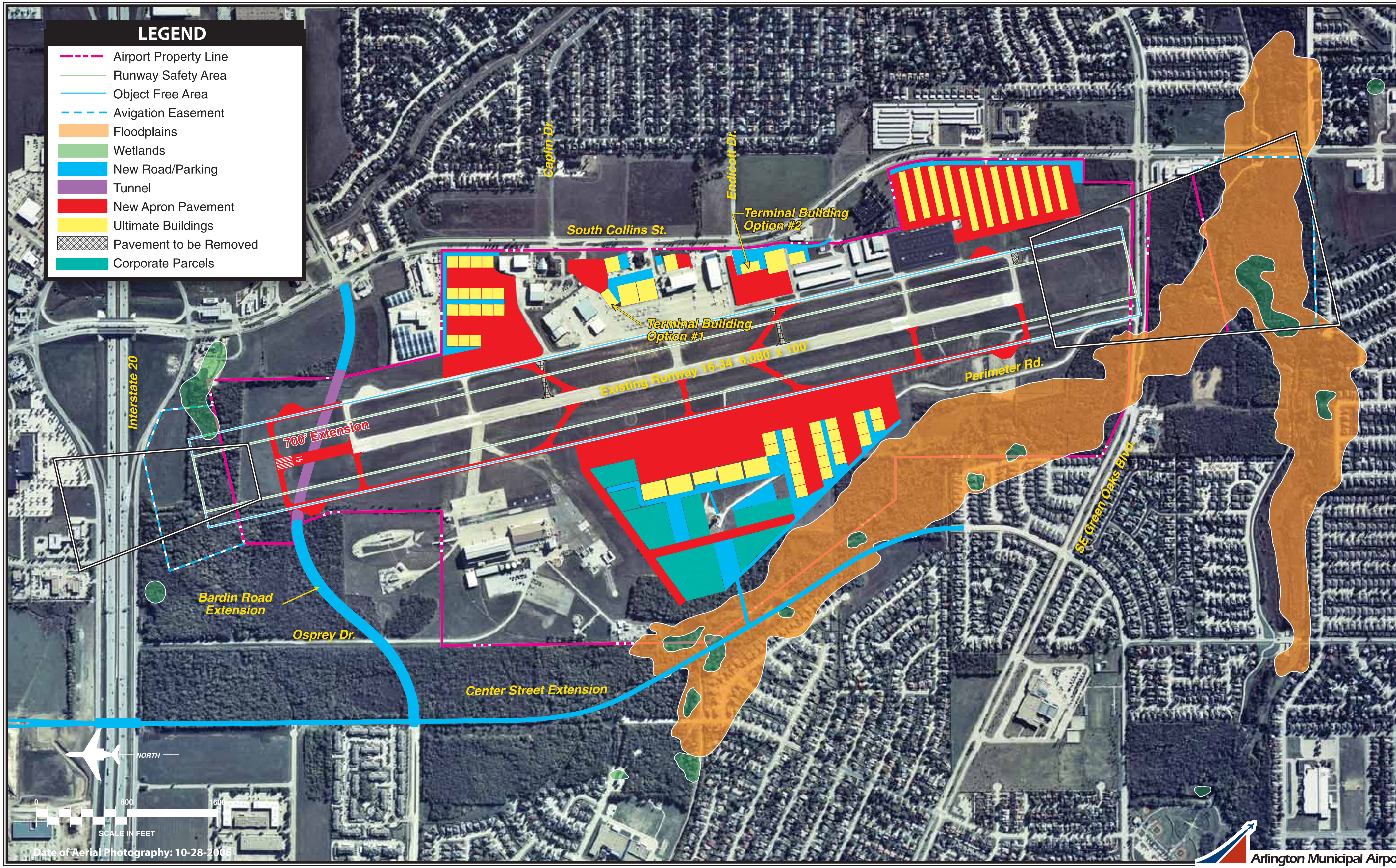

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Exhibit 4H
LANDSIDE ALTERNATIVE B

line in the area where City-owned T-hangar complexes are currently located. As in Alternative A, five T-hangar complexes would be removed and replaced by a terminal building and conventional hangar. Ramp apron space is provided in front of the terminal building, and hangar and automobile parking are provided to the east, adjacent to South Collins Street. To best utilize available space in this area, hangar development is shown directly east of an existing FBO hangar and north of the fuel farm.

As previously depicted, the southeast corner of the airport is proposed to handle several T-hangar complexes. Positioning these low-activity levels away from the central portion of the airport is desired, and will allow for ample aircraft storage for smaller single and multi-engine aircraft. The area to the north of the existing terminal area is again designated for executive hangar development, as depicted on the previous alternative.

A slightly different approach was taken in analyzing the west side of the airport for future development. **Exhibit 4H** shows several corporate parcels with direct taxiway access to the airside system. This considers a more unrestricted development plan which allows the airport flexibility in the size and type of operation that might be able to utilize the property. Conventional hangars are proposed adjacent to the flight line and in a central location, which would lend itself well to FBO operations and large corporate flight departments. Smaller executive hangar complexes are located farther south. Access to the west side of the airport would be obtained by the future extension of Center Street.

Advantages: It shows maximum utilization of available space on the east side of airport with the most potential for hangar construction. Terminal building option #2 provides convenient access to and from the airfield system. Proper separation of aviation activity levels is considered on both sides of the airfield.

Disadvantages: As previously discussed in Alternative A, the removal and potential re-location of City-owned T-hangars will be logistically and financially difficult. The location of terminal building option #1 does not face the immediate flight line and will not be as accessible to pilots and passengers due to the proximity of other hangars.

LANDSIDE ALTERNATIVE C

Landside Alternative C, depicted on **Exhibit 4J**, also shows two separate locations for a new terminal building. In keeping with the previous alternatives, the first option calls for the terminal building to be located on the east side of the airport, set back further east and north of its current location, closer to South Collins Street. Two conventional hangars are then proposed to be constructed on the current terminal building site. Also depicted are two smaller hangars, both located in spaces that currently are vacant. This layout shows full utilization of the terminal area.

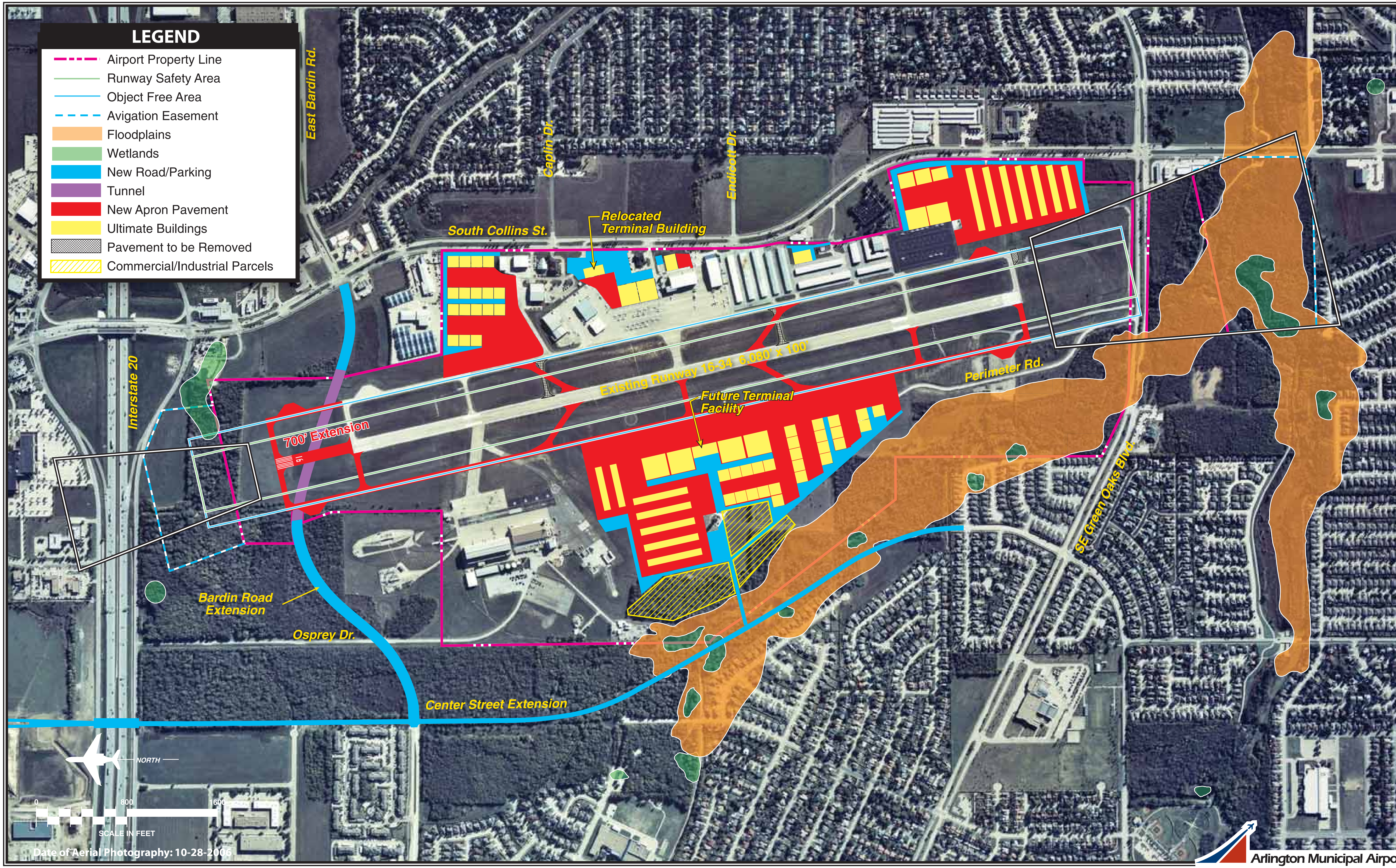

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Exhibit 4J
LANDSIDE ALTERNATIVE C

This alternative keeps the current City-owned T-hangar complexes in place. As a result, it is projected that fewer T-hangar spaces would be needed on the east side of the airfield, compared to what was depicted on the previous two landside alternatives. The southeast side of the airport considers a mix of conventional hangars and T-hangars. To the north of the terminal area, executive hangars are depicted for corporate flight departments and aircraft storage.

The second option for the construction of a new terminal building is to locate it on the west side of the airport. In keeping with previous alternatives, west side development depicts conventional hangars located adjacent to the flight line with the addition of the terminal building. This makes for convenient use of the airport for pilots and passengers alike, having FBO facilities and the terminal building in close proximity. Again, in order to properly separate aircraft activity levels, several complexes of executive hangars are located to the south of the terminal area, while T-hangars are located to the north and west. Separation of proposed hangar development from Bell-Helicopter Textron's current facilities is adequate.

This alternative also proposes commercial/industrial parcels to the west of aviation-related activity. These areas of development would generate additional revenue for the airport in the form of land leases, while creating a buffer between aviation activity and residential areas located to the west of the airport. Access to the west side is provided by the proposed Center Street extension.

Advantages: Terminal building options #1 and #2 both have a desired setting facing the flight line. The City-owned T-hangar complexes are shown in their current location, thus making the phasing of hangar development less complicated. Industrial/commercial development options on the west side of the airport provide an additional means of revenue and provide a buffer between aviation and residential land uses.

Disadvantages: It could be quite some time before the west side of the airport is provided proper access and utility infrastructure, thus making terminal building option #2 less attractive from a timing standpoint. The accessibility of this terminal option would not be as convenient either.

LANDSIDE SUMMARY

As previously depicted and discussed, several options were analyzed in determining landside development alternatives that would be most beneficial to the growth and development of Arlington Municipal Airport. All three alternatives propose development which would exceed the demand levels proposed in this plan. Each does, however, give the City a future vision of what the airport could become. This vision is important, as it shifts the focus from haphazard, build-as-you-go development, to a long-term, focused development process. As a result, the City will be capable of providing a first-class airport which maximizes airport property.

Analysis was also conducted on acquiring adjacent properties to the airport to provide even more development potential for the airport in the future. Areas located northeast of the airport adjacent to the future Bardin Road extension were studied, as was a smaller parcel located on the corner of South Collins Street and Southeast Green Oaks Boulevard. At this time, it was determined that the cost of acquiring these parcels was going to be very expensive in comparison to the amount of development and return the airport would receive. In addition, there appears to be major site preparation work that would be needed, especially on the northeast area, before any facility development could take place. These reasons, combined with the proposed alternative layouts sufficiently accommodating long term aviation demand, did not warrant showing additional property acquisition at this time.

Actual demand levels will likely dictate facility development. For example, if the airport were required to house a large number of small aircraft, the decision to build (or allow private developers to build) T-hangars would be prudent. However, if corporate aircraft are more demanding, executive or conventional hangar development would be necessary. The ultimate plan will provide the City with the means to meet the future needs of these demands in an efficient manner.

Formulation of the landside alternatives was undertaken in a manner to minimize environmental impacts. Resources which could be impacted by any of the landside alternatives under consideration include the floodplain and wetland areas west of the airport as well as the wooded areas north, east, and west of the airport. Field surveys would be needed to delineate the boundaries of the wetland areas that would be impacted by the Center Street extension project as well as construction of the west airport access road. Surveys would also need to be undertaken to assess potential impacts to biological or cultural resources.

SUMMARY

The process utilized in assessing the airside and landside development alternatives involved a detailed analysis of short and long term requirements, as well as future growth potential. Current airport design standards were considered at every stage in the analysis. Safety, both air and ground, were given a high priority in the analysis of alternatives.

After review and input from the Planning Advisory Committee (PAC), City officials, and the public, a recommended concept will be developed by the consultant. The resultant plan will represent an airside facility that fulfills safety design standards, and a landside complex that can be developed as demand dictates. The development plan for Arlington Municipal Airport must represent a means by which the airport can evolve in a balanced manner, both on the airside and landside, to accommodate the forecast demand. In addition, the plan must provide flexibility to meet activity growth beyond the long range planning horizon.

The following chapters will be dedicated to refining the basic concept into a final plan, with recommendations to ensure proper implementation and timing for a demand-based program.

Arlington Municipal Airport

Chapter Five

AIRPORT PLANS

Arlington Municipal Airport

AIRPORT PLANS

CHAPTER 5

The airport master planning process for Arlington Municipal Airport (GKY) has evolved through the development of forecasts of future demand, an assessment of future facility needs, and the evaluation of airport development alternatives to meet those future facility needs. The planning process has included the development of three sets of draft phase reports which were presented to the Planning Advisory Committee (PAC) and public information workshops. The City of Arlington and airport administration have participated in each of these meetings and have been actively involved in the master planning process.

The PAC was comprised of several constituents with a stake in the Arlington Municipal Airport. Groups represented on the PAC included the Texas Department of Transportation (TxDOT) - Aviation Division, Arlington City Council, airport administration, airport traffic control tower (ATCT) personnel, airport fixed base operators (FBOs), various city departments, Arlington Chamber of Commerce, airport tenant associations, and a citizen representative. This diverse group has provided valuable input into this recommended plan.

In the previous chapter, several development alternatives were analyzed to explore different options for the future growth and development of Arlington Municipal Airport. The development alternatives have been refined into a single recommended concept for the master plan. This chapter describes, in narrative and graphic form, the recommended direction for the future use and development of Arlington Municipal Airport.

RECOMMENDED MASTER PLAN CONCEPT

The recommended master plan concept incorporates airside development elements suggested in Airfield Alternative 1A, presented in Chapter Four – Alternatives. Landside development closely follows the improvements suggested in Landside Alternative C, with the exception of incorporating conventional hangars in the terminal area where existing City-owned T-hangars are located. As a result, the recommended concept provides the airport with the ability to meet the increasing demands on the airport by corporate aircraft, while also providing adequate space for smaller general aviation aircraft operators.

It is important to note that the finalized concept provides for anticipated facility needs over the next twenty years, as well as establishing a vision and direction for meeting facility needs beyond the planning period. The City of Arlington and the Dallas/Ft. Worth Metroplex have experienced significant growth over the past several years, and it can be expected that the area will continue to experience strong growth in the coming years.

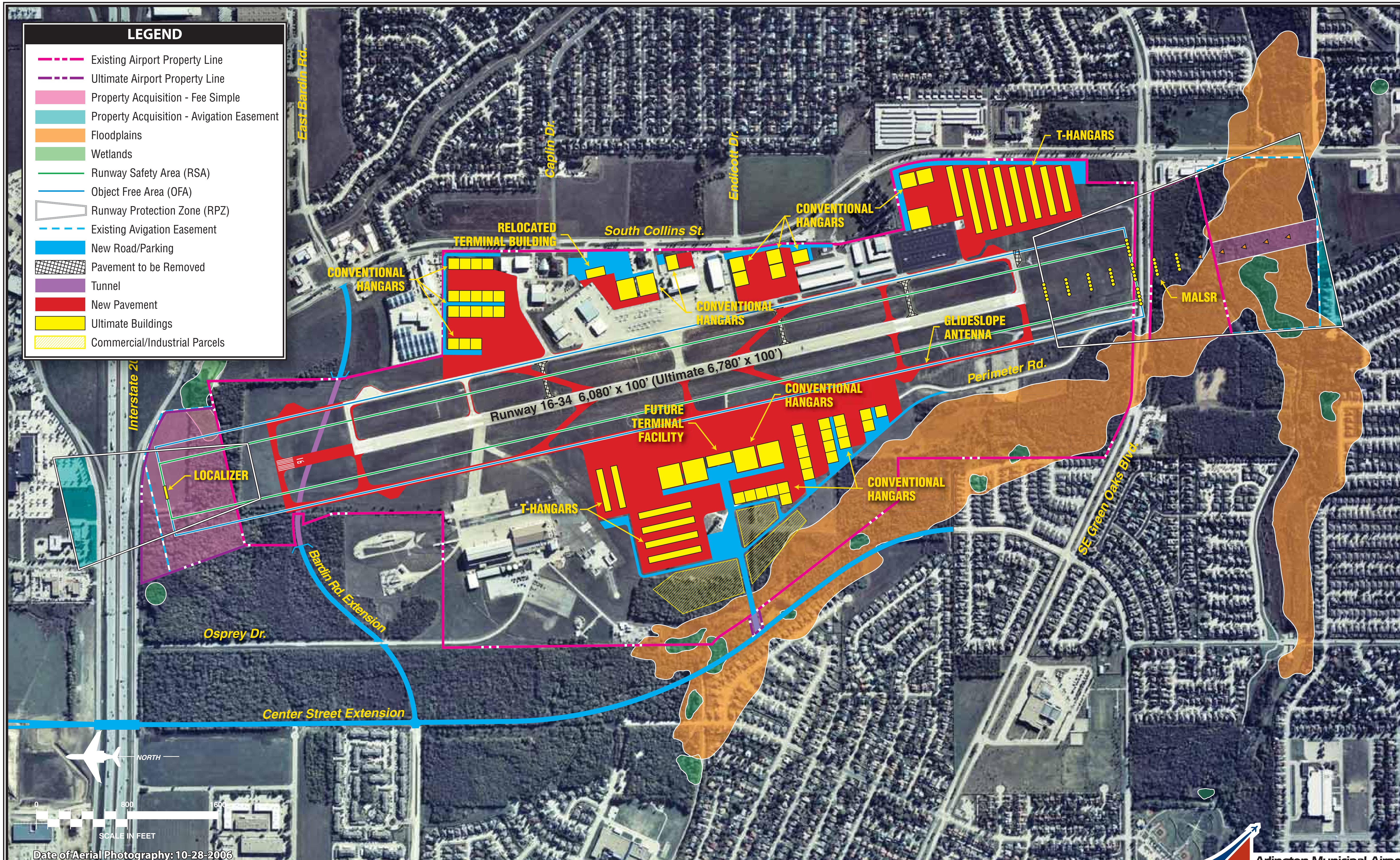
The City of Arlington supports a diverse economic base that includes General Motors and the Texas Rangers Major League Baseball franchise. Beginning in 2009, the Dallas Cowboys National Football League (NFL) franchise will call the City of Arlington its home, and in 2011, the City will host the NFL Super Bowl. With the presence of these large venues and economic stimulators, it is important that the Arlington Municipal Airport be able to accommodate the projected growth and activity that is likely to occur as a result. The City has responded with the construction of a new ATCT and the installation of an instrument landing system (ILS). The following sections summarize the airside and landside development recommendations as depicted on **Exhibit 5A**.

AIRFIELD DESIGN STANDARDS

The Federal Aviation Administration (FAA) and TxDOT – Aviation Division have established design criteria to define the physical dimensions of runways and taxiways and the imaginary surfaces surrounding them which provide for the safe operation of aircraft at the airport. These design standards also define the separation criteria for the placement of landside facilities.

As discussed previously, FAA and TxDOT design criteria primarily center on the airport's critical design aircraft. The critical aircraft is the most demanding aircraft or family of aircraft which will conduct 250 or more operations (take-offs or landings) per year at the airport. Factors included in the airport design are an aircraft's wingspan, tail height, approach speed, and in some cases, the runway approach visibility minimums. The FAA has established the Airport Reference Code (ARC) to relate these factors to airfield design standards.

Analysis in Chapter Three – Airport Facility Requirements indicated that



06MP10-5A-7/30/07

Exhibit 5A
MASTER PLAN CONCEPT

Arlington Municipal Airport is presently used by a wide range of general aviation aircraft. The majority of these aircraft include single and multi-engine aircraft which fall into ARC A-I and B-I categories. In addition, larger business and cargo aircraft that fall within approach categories B, C, and D and airplane design groups (ADGs) II and III are using the airport more frequently.

The largest based aircraft in terms of ARC category will often account for the design standard to be applied to the airport. The largest aircraft currently based at Arlington Municipal Airport are ARC B-II (Cessna Citation 500 series and Hawker 800) and ARC C-I (Lear 35) aircraft. The combination of these aircraft yield an ARC C-II as the critical design for based aircraft.

Due to the large amount of transient jet operations at the airport, consideration was also given to these aircraft. The analysis indicated that the airport had a minimum of 2,036 operations by aircraft ranging from ARC B-I to D-III. Of these operations, the largest aircraft included the Gulfstream V (D-III), Boeing 727 (C-III), and DC-9 (C-III). Aircraft in approach category C (736 operations) and ADG II (1,196 operations) currently exceed the threshold of 250 or more operations per year for the most demanding family of aircraft. As a result, **the existing critical aircraft falls in ARC C-II**.

The master plan anticipates that jet aircraft use will continue to increase in the future, consistent with national trends and FAA forecasts. It is anticipated that the airport will be increasingly utilized by businesses and fractional-ownership groups who are conducting business in Arlington and the Dallas/Fort Worth Metroplex. **In the short term (within five years), the critical aircraft can be expected to shift to D-II**, which include Gulfstream II and IV aircraft.

The airport currently handles a large number of ARC C-III operations represented by DC-9 and Boeing 727 aircraft that are hauling on-demand freight for local businesses. Although these aircraft do not currently meet the threshold for critical aircraft design, it is expected that they, along with other ADG III business jets, will increasingly utilize the airport. The Gulfstream V, Global Express, and Boeing Business Jet, all group III aircraft, are increasing in the fleet and could appear more regularly at general aviation reliever airports such as Arlington Municipal Airport. As a result, **ultimate planning should conform to ARC C/D-III**.

Upgrading the airport to ARC C/D-III design standards will allow the airport to accommodate all business jets and several types of cargo aircraft on the market today. Moreover, meeting these design requirements will ensure that the airport is well positioned to remain competitive for aviation businesses and those businesses which have aviation needs. As a result, the airport will serve as a valuable resource for the City and surrounding area as it competes for economic development in a very dynamic marketplace.

Table 5A summarizes the airport design standards to be applied at Arlington Municipal Airport. The table presents two airfield planning design standards for the airport. The first column summarizes FAA and TxDOT airfield design standards for ARC C-II aircraft under current conditions. The middle column considers the improvements necessary to accommodate larger business jets such as a longer runway and improved instrument approaches to Runway 34. The last column presents the airfield design criteria for ARC C/D-III aircraft. This takes into consideration larger business and cargo jet aircraft basing at the airport or utilizing the airport on a frequent basis.

TABLE 5A
Airfield Planning Design Standards (Ultimate)
Arlington Municipal Airport

	Existing ARC C-II		Improved ARC C/D-II		Ultimate ARC C/D-III	
Design Standards						
Airport Reference Code (ARC)	C-II		C/D-II		C/D-III	
Lowest Visibility Minimums	1 mile		1/2 mile		1/2 mile	
Runways						
Length (ft.)	6,080		6,780		6,780	
Width (ft.)	100		100		100	
Pavement Strength (lbs.)						
Single Wheel (SWL)	60,000		60,000		60,000	
Dual Wheel (DWL)	N/A		120,000		120,000	
Shoulder Width (ft.)	10		10		20	
Runway Safety Area						
Width (ft.)	500		500		500	
Length Beyond Runway End (ft.)	1,000		1,000		1,000	
Length Prior to Landing (ft.)	600		600		600	
Object Free Area						
Width (ft.)	800		800		800	
Length Beyond Runway End (ft.)	1,000		1,000		1,000	
Obstacle Free Zone						
Width (ft.)	400		400		400	
Length Beyond Runway End (ft.)	200		200		200	
Taxiways						
Width (ft.)	35-75		35		50	
OFA (ft.)	131		131		186	
Centerline to Fixed or Moveable Object (ft.)	66		66		93	
Runway Centerline to:						
Parallel Taxiway Centerline (ft.)	300		400		400	
Aircraft Parking Area (ft.)	400		500		500	
Building Restriction Line (ft.)						
20 ft. Height Clearance	640		640		640	
35 ft. Height Clearance	745		745		745	
Runway Protection Zones	16	34	16	34	16	34
Inner Width (ft.)	500	500	500	1,000	500	1,000
Outer Width (ft.)	1,010	1,010	1,010	1,750	1,010	1,750
Length (ft.)	1,700	1,700	1,700	2,500	1,700	2,500
F.A.R. Part 77 Approach Surface Slope	20:1	34:1	20:1	50:1	20:1	50:1
Threshold Siting Surface Slope	20:1	20:1	20:1	34:1	20:1	34:1

Source: FAA Advisory Circular 150/5300-13, Airport Design, Change 11

AIRSIDE RECOMMENDATIONS

The airside recommendations primarily focus on providing the runway and taxiway systems with the means to accommodate larger and faster jet aircraft which currently operate at the airport and are projected to account for the critical design aircraft in the future. Also of importance is meeting the safety area standards for the runway and taxiway system and providing for increased capacity at the airport. Additional recommendations include the strategic acquisition of property adjacent to the airport to ensure compatible land uses surrounding the airport and to protect approaches to the airport.

Runway 16-34

Runway 16-34 is currently 6,080 feet long by 100 feet wide. The current length is capable of accommodating most general aviation aircraft; however, it falls short of the requirements for many larger and faster business and cargo jet aircraft which frequent the airport. Of primary consideration is providing the runway system with the means to accommodate these larger and faster aircraft which currently operate at the airport and are projected to account for the critical aircraft in the future.

Analysis presented in Chapter Three – Airport Facility Requirements indicated that in order to accommodate 100 percent of business jets weighing less than 60,000 pounds at 60 percent useful load, FAA design criteria calls for the runway to be at least 6,200 feet long. Several types of jet aircraft utilizing Arlington Municipal Airport fall into this category, such as Challengers, Hawkers, and some Learjets. The hot and humid weather conditions the airport experiences during summer months requires these aircraft to lengthen their take-off roll, which results in even longer runway lengths. Furthermore, future demand at Arlington Municipal Airport indicates that business and cargo jet operations up to and including those in ARC C/D-III will continue to increase, and the airport should strive to accommodate these operations. Analysis indicated that a runway length of 7,000 feet is needed to fully accommodate future critical aircraft, such as the Gulfstream, Boeing 727, and DC-9.

Due to physical constraints adjacent to the north and south ends of the airport, mainly Interstate Highway 20 and Southeast Green Oaks Boulevard respectively, the recommended plan considers extending Runway 16-34 700 feet to the north. The northerly extension of the runway would be encompassed entirely on airport property; however, additional property would need to be acquired to secure areas within the runway protection zone (RPZ), runway safety area (RSA), and object free area (OFA). The proposed plan considers the fee simple acquisition of approximately 24.4 acres of land to the north of Runway 16-34. This property is currently vacant. The RPZ extends further north across Interstate Highway 20. Although the FAA typically recommends fee simple property acquisition for areas within the RPZ, avigation easements can be obtained. An avigation easement is typically structured to provide the airport with control of the airspace above the property but can also include noise considerations. Approximately 5.4 acres of land is included in the north RPZ and is currently occupied by commercial development.

TxDOT will require specific justification for the extension, such as an existing operator at the airport whose aircraft requires a longer runway, before funding is provided. The planned length will ensure that the airport will be capable of accommodating a large majority of aircraft activity, including business and cargo jet aircraft.

Runway 34 has recently transitioned to a precision instrument runway. A localizer and glideslope antenna was recently installed at the airport to accommodate the precision ILS approach. A medium intensity approach lighting system with runway alignment lights (MALSR) is planned for implementation next year (2008). The ILS and MALSR will support a precision approach that allows aircraft the capability to land with visibilities down to one-half mile and/or cloud ceilings down to 200 feet, commonly referred to as Category I (CAT I) minimums. Due to an increased RPZ associated with the precision instrument approach and protection of the MALSR, additional land to the south of Runway 16-34 should be acquired to protect the enlarged safety areas. Approximately 6.9 acres are needed to protect the safety areas, with 4.4 acres acquired through fee simple acquisition for the MALSR. The remaining 2.5 acres are located in the southeast and southwest corners of the ultimate RPZ, with residential development contained in the southwest area. Avigation easements should be sought in these areas.

Taxiways

The design of taxiway and apron areas must also consider the critical aircraft identified for Arlington Municipal Airport. The primary consideration is given to wingspan of the most demanding aircraft to operate at the airport. The parallel and connecting taxiways, transient apron areas, and aircraft maintenance areas have all been designed to accommodate aircraft within ADG II, wherever appropriate. This standard requires taxiways to be at least 35 feet wide for aircraft in ARC C/D-II.

As previously discussed, it is recommended that the airport be planned to accommodate ARC C/D-III aircraft in the future. ADG III standards call for taxiways to be at least 50 feet wide. As a result, the parallel and connecting taxiways on the east side of Runway 16-34 are planned to be widened to 50 feet and all future taxiways should also meet this criteria.

As the airport continues toward full build-out of developable land on its east side, future growth and development will need to be focused on the west side of the airport. In order to accommodate this growth, the recommended plan considers a full-length parallel taxiway on the west side of Runway 16-34. Not only would this taxiway provide access to west side development, it could also serve as a "temporary" runway when the primary runway is closed for routine maintenance. In doing so, it would ensure the airport remains open and can support a large percentage of the forecast operations. As a result, it is recommended that the west side parallel taxiway be constructed to 75 feet in width to better accommodate aircraft when used as a "temporary" runway.

It should be noted that the proposed location of the west side parallel taxiway is in line with the current location of the ILS glideslope antenna, which is 400 feet west of the runway centerline and approximately 1,000 feet from the Runway 34 threshold. In order to satisfy glideslope critical area requirements, the plan recommends phasing the construction of the west side parallel taxiway. The majority of the west side parallel taxiway can be developed without obstructing the glideslope critical area. With proper safety areas taken into consideration, this taxiway could still serve as a "temporary" runway for aircraft, providing between 4,500 feet and 5,000 feet of usable takeoff and landing distance. In an effort to minimize the amount of time aircraft are on the runway, it is recommended that existing Taxiway B on the east side of Runway 16-34 be relocated approximately 200 feet to the north to be in line with the proposed taxiway entrance/exit on the west side of the runway.

Due to the physical constraints in proximity to the current location of the glideslope antenna, it cannot be relocated west of its current location as the glideslope critical area would be obstructed by a perimeter road. As a result, the proposed plan recommends developing the remaining south portion of the west side parallel taxiway (approximately 1,080 feet) only if the ground-based navigation equipment associated with the ILS precision approach is replaced completely by a global positioning system (GPS) precision approach.

The existing parallel taxiway is located 400 feet east of the runway (centerline to centerline). This separation is adequate under current and future conditions. The future west side parallel taxiway is also planned to be located 400 feet from the runway (centerline to centerline).

The taxiway OFA is designed such that the wings of an aircraft traversing the taxiway will not encounter obstructions along the route. ARC C/D-II design standards call for a 131-foot wide taxiway OFA. ARC C/D-III standards require the OFA to expand to 186 feet wide. Currently, the ARC C/D-II taxiway OFA does not impact any existing structures or parking areas. For ARC C/D-III, however, the taxiway OFA penetrates some aircraft parking on the main terminal ramp apron. In order to accommodate these aircraft and this level of design, the marked aircraft parking spaces would need to be removed and/or relocated.

Analysis in Chapter Three – Airport Facility Requirements also indicated that the airport is currently at approximately 70 percent of its annual service volume, and is forecast to reach 89 percent by the long term planning period. FAA Order 5090.3B, *Field Formulation of the National Plan of Integrated Airport Systems*

(NPIAS), indicates that improvements for airfield capacity purposes should begin to be considered once operations reach 60 to 75 percent of the annual service volume. This is an approximate level to begin the detailed planning of capacity improvements. Capacity constraints are not an issue at the airport currently, but forecasts indicate that improvements may benefit the airport by the long term. As a result, high-speed taxiway exits are recommended, as they can add as much as 10 percent to overall capacity.

Airside Summary

The following list includes the major considerations for airside improvements at Arlington Municipal Airport throughout the planning period.

- Install MALSR to enhance the precision ILS approach.
- Construct the west side parallel taxiway and connecting taxiways to Runway 16-34.
- Acquire 24.4 acres of land through fee simple acquisition north of the airport for Runway 16-34 extension.
- Acquire 7.9 (5.4 acres north of I-20; 2.5 acres in south RPZ) acres of land in the north and south RPZs through at least an avigation easement to protect airport approaches.
- Extend Runway 16-34 and parallel taxiways 700 feet north.
- Construct four high-speed taxiway exits.
- Widen existing east side taxiways to 50 feet to accommodate ADG III aircraft.

LANDSIDE RECOMMENDATIONS

All existing landside facilities at Arlington Municipal Airport are located on the east side of the runway except for Bell Helicopter's private facility and the ATCT. Parallel Taxiway A connects the main terminal apron to either end of the runway. The current terminal building is located at approximately midfield, with hangar development located to the north and south. Conventional, executive, and T-hangar storage space is provided, and the airport maintains a waiting list for additional hangar space.

The primary goal of landside facility planning is to provide adequate aircraft storage space while also maximizing operational efficiencies and land uses. Achieving this goal yields a development scheme which segregates aircraft users (large vs. small aircraft) while maximizing the airport's revenue potential. **Exhibit 5A** depicts the recommended landside development plan for the airport.

East Side Development Area

As previously mentioned, all public-use aviation-related facilities are located on the east side of the airport. This includes the general aviation terminal building, aircraft storage hangars, aircraft parking, and other support facilities.

The current terminal building was constructed in 1982 and provides for approximately 7,000 square feet of space that is occupied by airport administrative offices, a pilot's lounge, and other amenities. Analysis in Chapter Three – Airport Facility Requirements indicated the need for additional terminal building space to accommodate the future demands of airport users.

Analysis also outlined a need to expand public parking to meet the needs of projected passenger growth at the airport. In an effort to better accommodate future airport users and maximize the amount of available space in the terminal area, the recommended plan proposes the construction of a new terminal building site approximately 400 feet northeast of the current location. Proposed parking associated with the new terminal building location will also require reconfiguring the terminal access road to provide for maximum marked automobile parking spaces.

An added benefit of the new terminal building location will be the amount of additional space made available for hangar development and aircraft parking. The recommended plan includes conventional hangar development in the area of the existing terminal building and increased aircraft parking apron space.

Other areas on the east side of the airport were closely studied for future development. To the north of the terminal area is land designated for executive hangar development which will accommodate corporate flight departments and aviation businesses. Additional apron space is also provided to accommodate transient aircraft in the event that the terminal apron areas farther south are occupied.

The southeast area of the airport is designated for eight rows of T-hangars and some larger conventional hangars. Fixed base operator (FBO) activities or bulk aircraft storage could be located in the conventional hangars while single and smaller multi-engine aircraft would inhabit the T-hangar facilities.

In an effort to provide for additional aircraft parking space and conventional hangar development near the terminal apron area, the plan recommends removal of five City-owned T-hangar complexes over the course of the planning period that will be relocated in the southeast development area. This will also provide better separation of aircraft activity levels between large and small aircraft. The plan recommends that the current south ramp apron pavement, adjacent to this future development, be reconstructed and strengthened to withstand larger aircraft that will be transitioning through this area associated with the conventional hangar development to the east.

West Side Development Area

The recommended plan also proposes future development of the west side of the airport. As a large majority of this area is currently vacant, significant improvements will be needed, including roadway access and utility extensions, before infrastructure development can begin. Careful consideration should be given regarding the implementation of staging projects in this area. While the recommended plan shows total build-out of the west side, actual demand will dictate the timeline for future development, which is likely to extend well beyond the long term planning period associated with this document.

The City of Arlington currently has a plan for Center Street to extend south adjacent to the west side of the airport. In doing so, an access road can be constructed from Center Street providing access to the west side of the airport. City plans also show the extension of Bardin Road to the west, connecting South Collins Street to Center Street on the northwest side of the airport. In order for this to occur, Bardin Road will be tunneled under the north area of the airport. This will also provide for more convenient access to the west side of the airport.

The orderly development of the west side will be important and should provide for the proper separation of high, medium, and low activity levels at the airport. The high-activity area should be planned and developed to provide aviation services on the airport. Examples would include the terminal facility and adjoining aircraft parking areas, which provide tie-down locations and circulation for aircraft. Large conventional style hangars used for FBOs, corporate aviation departments, and the storage of large numbers of aircraft should also be considered in this area. The best locations for these types of activities are along the flight line near midfield.

To the south of the proposed terminal area includes smaller conventional and executive hangars that would fit the medium-activity level. The best location for this type of activity is off the immediate flight line, but still readily accessible to aircraft, including corporate jets.

Finally, the low-activity levels consist of the area for storage of smaller single and multi-engine aircraft and typically include T-hangars. Six T-hangar complexes are proposed in the west side development area and are set back from the flight line, which is preferred.

A portion of the west side of the airport will not be provided airside access. Automobile access routes limit the areas from airside access. As such, the utility of these areas is limited to non-aviation purposes in the form of commercial and industrial parcels. These uses are allowable by the FAA as long as they are not minimizing the availability of aviation related property. Industrial and commercial uses provide the airport with an opportunity to improve revenue streams, increasing the airport's financial resources. These uses should be promoted as a means to bolster the airport's financial position and ability to become and remain financially self-sufficient.

Landside Summary

The following list includes the major considerations for landside improvements at Arlington Municipal Airport throughout the planning period.

- Improve utilities, aircraft access, and automobile access to the southeast area of the airport for future hangar development.
- Construct a new terminal building northeast of the current location on the airport.
- Construct additional aircraft parking to accommodate future aircraft demand.
- Remove/relocate five City-owned T-hangar complexes and replace them in the southeast area of the airport.
- Construct executive hangars in the northeast area of the airport.
- Construct automobile access roads and improve utilities to the west side of the airport.
- Consider proper implementation of infrastructure development on the west side of the airport to include a terminal facility area, hangars, and aircraft apron space.

AIRPORT LAYOUT PLAN DRAWINGS

Per FAA and TxDOT requirements, an official Airport Layout Plan (ALP) has been developed for Arlington Municipal Airport and can be found at the end of this chapter. The ALP drawing graphically presents the existing and ultimate airport layout plan. It is used by the FAA and TxDOT to determine funding eligibility for future development projects. The remainder of this chapter provides a brief description of the ALP drawings that will be submitted to the FAA and TxDOT for approval. The set includes:

- Airport Layout Drawing
- Inner Approach Surface and Runway Profile Drawings (multiple sheets)
- Terminal Area Drawing (multiple sheets)
- Airport Land Use Drawing
- Property Map Drawing

The ALP was prepared on a computer-aided drafting system (Auto-CAD) to allow easier updating and revisions. The set provides detailed information on existing and future facilities and must reflect any future development under consideration for potential funding with the Airport Improvement Program (AIP).

AIRPORT LAYOUT DRAWING

The Airport Layout Drawing (ALD) graphically presents the existing and ultimate airport layout. Data tables for runway and building information have been included on a separate drawing sheet. The ALD also depicts runway protection zones, property boundaries, building restriction lines, elevation information, wind information, runway and taxiway details, location of navigational aid equipment, and several tables to identify object penetrations or modifications to FAA standards. This drawing must be approved by the FAA and TxDOT before individual projects shown on the drawing are approved for construction.

INNER APPROACH SURFACE AND RUNWAY PROFILE DRAWINGS

The Inner Approach Surface and Runway Profile Drawings are prepared for each runway approach surface and runway end, with details provided on runway protection zones (RPZ), runway safety areas (RSA), object free areas (OFA), obstacle free zones (OFZ), and threshold siting surfaces (TSS). It is intended to provide enlarged views and detail of the approaches for evaluation of obstructions or potential obstructions.

TERMINAL AREA DRAWING

The Terminal Area Drawing provides greater detail of the facilities planned for buildings, hangars, auto parking areas, aircraft parking and maneuvering areas, immediate terminal access, and service roads.

AIRPORT LAND USE DRAWING

The Airport Land Use Drawing is provided in the set to depict future uses of airport property. Much of this information was included in **Exhibit 5A**. The land use categories include airfield operations, commercial, general aviation, non-aviation-related revenue support, aviation-related revenue support, recreational, residential, and floodplain. The plan depicts the ultimate use of the airport property, taking into consideration potential runway and taxiway development, building restriction lines, and potential redevelopment areas. As facilities are proposed on airport property, they will need to be coordinated with the FAA and TxDOT.

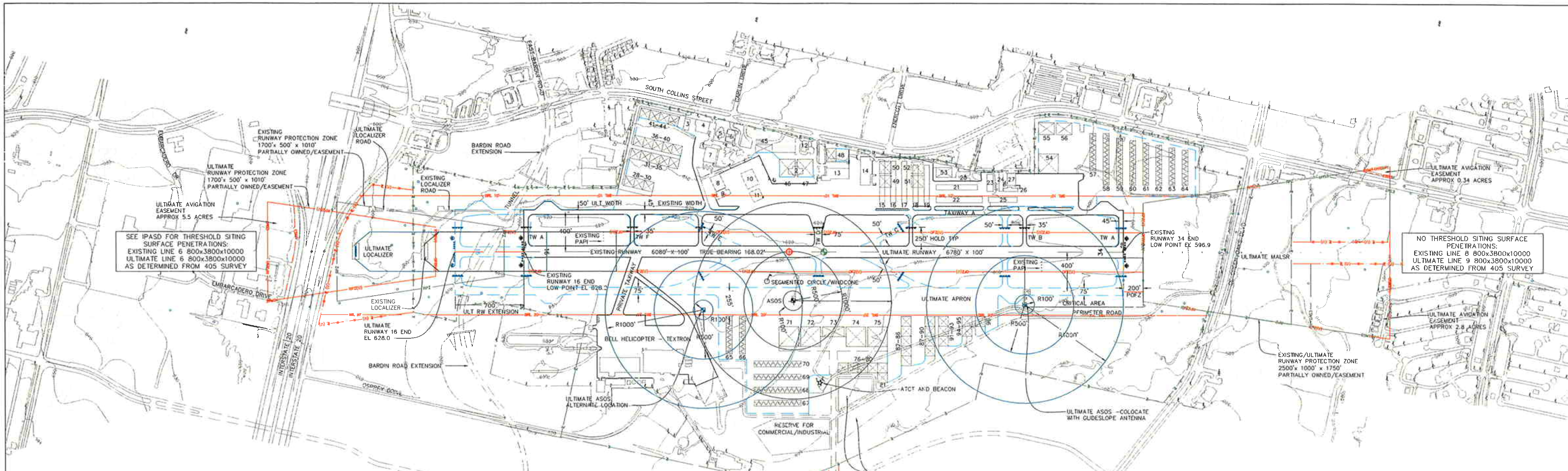
PROPERTY MAP DRAWING

The Property Map Drawing provides information on the acquisition and identification of all land tracts owned by Arlington Municipal Airport. Information including tract numbers, property interest, acreage, and project number (if acquired with federal funds) are included on this drawing.

SUMMARY

The recommended master plan concept has been developed in conjunction with the Planning Advisory Committee, Arlington Municipal Airport management, city officials, and airport businesses/users, and is designed to assist in making decisions on the future development and growth of Arlington Municipal Airport. This plan provides the necessary development to accommodate and satisfy the anticipated growth over the next 20 years and beyond.

Flexibility will be very important to future development at the airport. Activity projected over the next 20 years may not occur as predicted. The plan has attempted to consider demands that may be placed on the airport even beyond the 20-year planning horizon to ensure that the facility will be capable of handling a wide range of circumstances. The recommended plan provides the airport stakeholders with a general guide that, if followed, can maintain the airport's long term viability and allow the airport to continue to provide air transportation service to the region.



RUNWAY END COORDINATES AND ELEVATIONS

	LATITUDE	LONGITUDE	ELEVATION
EXISTING RWY 16 END	32°40'19.36"	097°05'46.79"	628.2'
ULTIMATE RWY 16 END	32°40'26.14"	097°05'48.49"	628.0'
EXISTING RWY 34 END	32°39'20.51"	097°05'32.03"	596.9'

BUILDING TABLE

BLDG. #	DESCRIPTION EXISTING	DESCRIPTION ULTIMATE	TOP ELEVATION
1	ATCT	NA	724.1'
2	TERMINAL BUILDING	NA	638.7'
3	EXECUTIVE HANGAR	NA	628.0'
4	CONVENTIONAL HANGAR	NA	632.2'
5	OFFICE	NA	633.9'
6	COMMERCIAL BUILDING	NA	637.5'
7	CONVENTIONAL HANGAR	NA	639.5'
8	CONVENTIONAL HANGAR	NA	642.6'
9	CONVENTIONAL HANGAR	NA	644.2'
10	CONVENTIONAL HANGAR	NA	636.3'
11	CONVENTIONAL HANGAR	NA	653.8'
12	FIRE STATION #12	NA	641.1'
13	CONVENTIONAL HANGAR	NA	653.8'
14	CONVENTIONAL HANGAR	NA	647.4'
15	T-HANGARS	NA	628.9'
16	T-HANGARS	NA	628.3'
17	T-HANGARS	NA	628.3'
18	T-HANGARS	NA	629.4'
19	T-HANGARS	NA	629.9'
20	FUEL FARM	NA	620.0'
21	T-HANGARS	NA	629.6'
22	T-HANGARS	NA	632.3'
23	EXECUTIVE HANGAR	NA	633.8'
24	EXECUTIVE HANGAR	NA	631.4'
25	T-HANGARS	NA	640.0'
26	EXECUTIVE HANGAR	NA	626.8'
27	EXECUTIVE HANGAR	NA	630.2'
28	NA	EXECUTIVE HANGAR	636.0'
29	NA	EXECUTIVE HANGAR	636.0'
30	NA	EXECUTIVE HANGAR	636.0'
31	NA	EXECUTIVE HANGAR	630.0'
32	NA	EXECUTIVE HANGAR	630.0'
33	NA	EXECUTIVE HANGAR	630.0'
34	NA	EXECUTIVE HANGAR	630.0'
35	NA	EXECUTIVE HANGAR	630.0'
36	NA	EXECUTIVE HANGAR	630.0'
37	NA	EXECUTIVE HANGAR	630.0'
38	NA	EXECUTIVE HANGAR	630.0'
39	NA	EXECUTIVE HANGAR	630.0'
40	NA	EXECUTIVE HANGAR	630.0'
41	NA	EXECUTIVE HANGAR	619.0'
42	NA	EXECUTIVE HANGAR	619.0'
43	NA	EXECUTIVE HANGAR	619.0'
44	NA	EXECUTIVE HANGAR	619.0'
45	NA	RELOCATED TERMINAL	646.0'
46	NA	CONVENTIONAL HANGAR	636.0'
47	NA	CONVENTIONAL HANGAR	636.0'
48	NA	CONVENTIONAL HANGAR	633.0'

ULTIMATE ELEVATIONS WILL VARY DUE TO FINAL GRADING AND DRAINAGE PLAN

BUILDING TABLE

BLDG. #	DESCRIPTION EXISTING	DESCRIPTION ULTIMATE	TOP ELEVATION
49	NA	CONVENTIONAL HANGAR	632.0'
50	NA	CONVENTIONAL HANGAR	634.0'
51	NA	CONVENTIONAL HANGAR	634.0'
52	NA	CONVENTIONAL HANGAR	632.0'
53	NA	CONVENTIONAL HANGAR	632.0'
54	NA	CONVENTIONAL HANGAR	626.0'
55	NA	CONVENTIONAL HANGAR	626.0'
56	NA	CONVENTIONAL HANGAR	625.0'
57	NA	T-HANGARS	625.0'
58	NA	T-HANGARS	625.0'
59	NA	T-HANGARS	625.0'
60	NA	T-HANGARS	625.0'
61	NA	T-HANGARS	625.0'
62	NA	T-HANGARS	624.5'
63	NA	T-HANGARS	624.0'
64	NA	T-HANGARS	624.0'
65	NA	T-HANGARS	626.0'
66	NA	T-HANGARS	626.0'
67	NA	T-HANGARS	622.0'
68	NA	T-HANGARS	622.5'
69	NA	T-HANGARS	623.0'
70	NA	T-HANGARS	623.5'
71	NA	EXECUTIVE HANGAR	635.0'
72	NA	EXECUTIVE HANGAR	635.0'
73	NA	FUTURE TERMINAL FACILITY	648.0'
74	NA	EXECUTIVE HANGAR	635.0'
75	NA	EXECUTIVE HANGAR	635.0'
76	NA	EXECUTIVE HANGAR	634.0'
77	NA	EXECUTIVE HANGAR	634.0'
78	NA	EXECUTIVE HANGAR	634.0'
79	NA	EXECUTIVE HANGAR	634.0'
80	NA	EXECUTIVE HANGAR	634.0'
81	NA	EXECUTIVE HANGAR	634.0'
82	NA	EXECUTIVE HANGAR	634.0'
83	NA	EXECUTIVE HANGAR	634.0'
84	NA	EXECUTIVE HANGAR	634.0'
85	NA	EXECUTIVE HANGAR	634.0'
86	NA	EXECUTIVE HANGAR	634.0'
87	NA	EXECUTIVE HANGAR	633.0'
88	NA	EXECUTIVE HANGAR	633.0'
89	NA	EXECUTIVE HANGAR	633.0'
90	NA	EXECUTIVE HANGAR	633.0'
91	NA	EXECUTIVE HANGAR	633.0'
92	NA	EXECUTIVE HANGAR	633.0'
93	NA	EXECUTIVE HANGAR	633.0'
94	NA	EXECUTIVE HANGAR	632.0'
95	NA	EXECUTIVE HANGAR	632.0'
96	NA	EXECUTIVE HANGAR	632.0'

ULTIMATE ELEVATIONS WILL VARY DUE TO FINAL GRADING AND DRAINAGE PLAN

GENERAL NOTES

AN OBSTRUCTION SURVEY WAS PERFORMED 9/25/2006 BY GEODETIX, INC., SAN ANTONIO, TX.

EXISTING RUNWAY END ELEVATIONS, AND BEARINGS NOTED IN THIS ALP SUPPLIED BY ASIS DATA SHEET SYSTEM, http://avnwww.jccbi.gov/datasheet/. HORIZONTAL DATUM NAD 83 STATE PLANE, TEXAS CENTRAL FIPS 4202 SURVEY FEET; VERTICAL DATUM NAVD 88. DO NOT APPLY CORRECTION FACTOR.

THE EXISTING HEIGHT HAZARD ZONING ORDINANCE FOR THIS AIRPORT WAS ADOPTED 1 DECEMBER 2002. ZONED 6080' x 100', RW 16 NPI; RW 34 PIA.

CAUTION ZONE LIGHTS ARE PRESENT AT ARLINGTON MUNICIPAL AIRPORT

NO OFZ OBJECT PENETRATIONS

ADDITIONAL STUDY REQUIRED TO DETERMINE OPTIMAL SITE FOR ASOS RELOCATION.

RUNWAY DATA TABLE

	RW 16-34 EXISTING		RW 16-34 ULTIMATE	
RUNWAY LENGTH & WIDTH (ft.)	6080' X 100'		6780' X 100'	
PAVEMENT DESIGN STRENGTH (lbs.)	60,000 SW		120,000 DW	
RUNWAY LIGHTING	MIRL		MIRL	
PERCENT EFFECTIVE GRADE	0.5%		0.5%	
PERCENT WIND COVERAGE	99.58%		99.58%	
MAXIMUM ELEVATION ABOVE MSL	628.2		628.2	
RW SURFACE TYPE	CONCRETE		CONCRETE	
RSA - LENGTH BEYOND RW END	1000'		1000'	
RSA - WIDTH	500'		500'	
OFA - LENGTH BEYOND RW END	1000'		1000'	
OFA WIDTH	800'		800'	
OFZ - LENGTH BEYOND RW END	200'		200'	
OFZ WIDTH	400'		400'	
RUNWAY END	**16**	**34**	**16**	**34**
RUNWAY MARKING	NPI	P	NPI	P
FAR PART 77 APPROACH CATEGORY	B(V)	C	B(V)	PIR
APPROACH TYPE	VISUAL	ILS	VISUAL	ILS
APPROACH SLOPE	20:1	50:1	20:1	50:1
RUNWAY VISUAL AIDS	PAPI-4 REIL	PAPI-4 REIL	PAPI-4 REIL	PAPI-4 MALSR
APPROACH VISIBILITY MINIMA	VISUAL	3/4 MILE	VISUAL	1/2 MILE
TOUCHDOWN ZONE ELEVATION	628.2'	620.0'	628.2'	620.0'
TAKE-OFF RUN AVAILABLE (TORA)	6080'	6080'	6780'	6780'
TAKE-OFF DISTANCE AVAILABLE (TODA)	6080'	6080'	6780'	6780'
APPROACH STOP DISTANCE AVAILABLE (ASDA)	6080'	6080'	6780'	6780'
LANDING DISTANCE AVAILABLE (LDA)	6080'	6080'	6780'	6780'

LEGEND

	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE with FENCE		
AIRPORT REFERENCE POINT (ARP)		
WIND CONE AND SEGMENTED CIRCLE		
THRESHOLD LIGHTS		
C&G BEACON		
FENCE LINE		
TELEPHONE/POWER POLE LINE		
NONDIRECTIONAL BEACON (NDB)		
RWY END IDENTIFIER LIGHTS (REILS)		
VGSI		
BUILDING RESTRICTION LINE (BRL)		
GROUND CONTOURS		
SIGNIFICANT OBJECT LOCATION		
TREES/BRUSH		
ASOS		
HOLD POSITION AND SIGN		
SURVEY MARKERS		

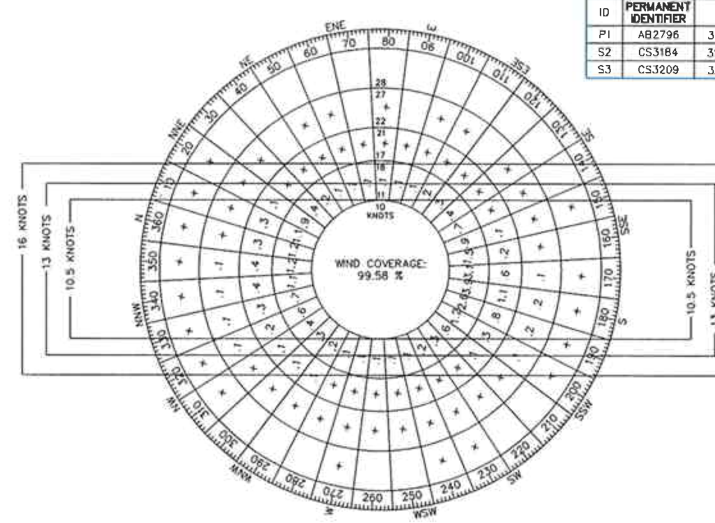
MAGNETIC NORTH
TRUE NORTH

MAGNETIC DECLINATION
4° 36' E (DECEMBER 2007)
ANNUAL RATE OF CHANGE
0° 7' W (DECEMBER 2007)

0 500 1000 2000
GRAPHIC SCALE

SURVEY MONUMENT COORDINATES

ID	PERMANENT IDENTIFIER	LATITUDE	LONGITUDE
P1	AB2796	32°39'51.93"	97°05'31.37"
S2	CS3184	32°39'42.42"	97°05'34.89"
S3	CS3209	32°40'01.49"	97°05'40.03"



WIND COVERAGE

RUNWAY	CROSSWIND COMPONENT	PERCENT
RUNWAY 16-34	16 KNOTS	99.58 %

AIRPORT DATA TABLE

	EXISTING	ULTIMATE
AIRPORT ELEVATION (MSL)	628.2'	628.2'
AIRPORT NAVIGATION AIDS	VOR/DME, GPS GLIDESLOPE LOCALIZER	VOR/DME, GPS GLIDESLOPE LOCALIZER
MEAN MAX TEMP (Hottest Month °F)	96°	96°
AIRPORT REFERENCE CODE (ARC)	C-II	C-III/D-III
TAXIWAY MARKING	STD W/℄	STD W/℄
TAXIWAY LIGHTING	MITL	MITL
AIRPORT REFERENCE POINT COORDINATES	32°39'49.90" 097°05'39.40"	32°39'53.33" 097°05'40.26"

DATUM COORDINATE SYSTEMS HORIZONTAL DATUM NAD 83 STATEPLANE TEXAS SOUTH FIPS 4202 FEET, VERTICAL DATUM NAVD 88.

A 405 SURVEY WAS COMPLETED AS PART OF THIS ALP.

ALL EXISTING COORDINATES AND ELEVATIONS SUPPLIED BY ASIS DATASHEET SYSTEM, http://avnwww.jccbi.gov/datasheet/

CAUTION ZONE LIGHTS ARE PRESENT AT ARLINGTON MUNICIPAL AIRPORT.

TEXAS DEPARTMENT OF TRANSPORTATION AVIATION DIVISION

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TITLE, AIRPORT SPONSOR'S REPRESENTATIVE

SIGNATURE — DATE

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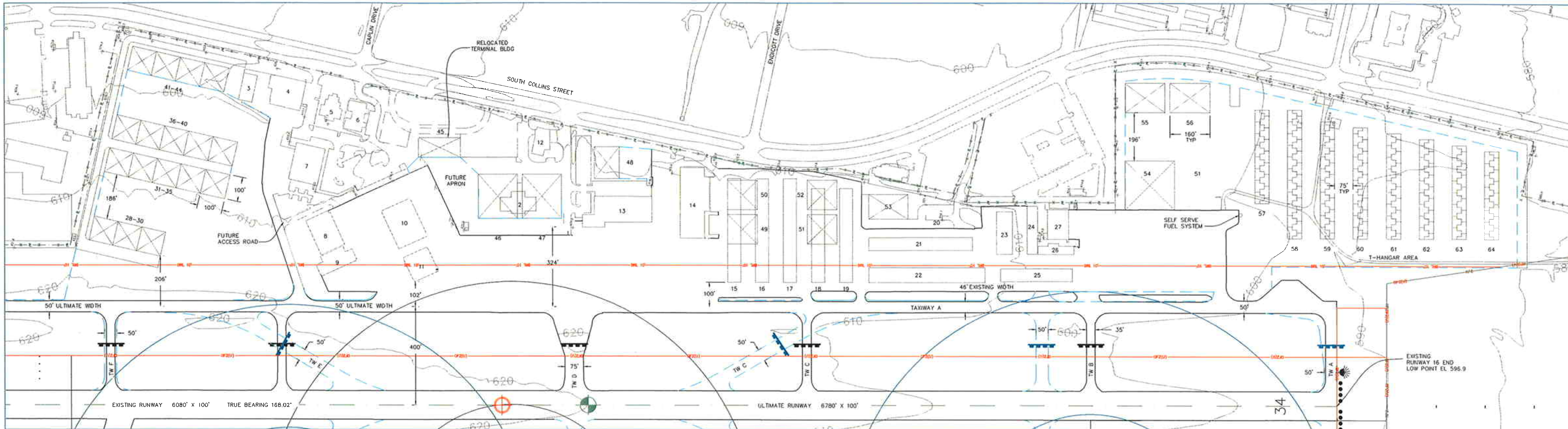
Coffman Associates
Airport Consultants
www.coffmanassociates.com

M. Quick — December 2007
DESIGNED BY — DATE
D. Hopkins — December 2007
DRAWN BY — DATE
M. Dmyterko — December 2007
CHECKED BY — DATE

AIRPORT LAYOUT DRAWING
ARLINGTON MUNICIPAL AIRPORT
ARLINGTON, TEXAS

Texas Department of Transportation
Aviation Division



GENERAL NOTES

SURVEY MAPPING PERFORMED 9/25/2006 BY GEODETIX, INC., SAN ANTONIO, TX.

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CAUTION ZONE LIGHTS ARE PRESENT AT ARLINGTON MUNICIPAL AIRPORT

BUILDING TABLE

BLDG. #	DESCRIPTION		TOP ELEVATION
	EXISTING	ULTIMATE	
2	TERMINAL BUILDING	NA	638.7'
3	EXECUTIVE HANGAR	NA	628.0'
4	CONVENTIONAL HANGAR	NA	632.2'
5	OFFICE	NA	633.9'
6	OFFICE	NA	637.5'
7	CONVENTIONAL HANGAR	NA	639.5'
8	CONVENTIONAL HANGAR	NA	642.6'
9	CONVENTIONAL HANGAR	NA	644.2'
10	CONVENTIONAL HANGAR	NA	636.3'
11	CONVENTIONAL HANGAR	NA	653.8'
12	FIRE STATION #12	NA	641.1'
13	CONVENTIONAL HANGAR	NA	653.8'
14	CONVENTIONAL HANGAR	NA	647.4'
15	T-HANGARS	NA	628.9'
16	T-HANGARS	NA	628.3'
17	T-HANGARS	NA	628.3'
18	T-HANGARS	NA	629.4'
19	T-HANGARS	NA	629.9'
20	FUEL FARM	NA	620.0'
21	T-HANGARS	NA	629.6'
22	T-HANGARS	NA	632.3'
23	EXECUTIVE HANGAR	NA	633.8'
24	EXECUTIVE HANGAR	NA	631.4'
25	T-HANGARS	NA	640.0'
26	EXECUTIVE HANGAR	NA	626.8'
27	EXECUTIVE HANGAR	NA	630.2'
28	NA	CONVENTIONAL HANGAR	636.0'
29	NA	CONVENTIONAL HANGAR	636.0'
30	NA	CONVENTIONAL HANGAR	636.0'
31	NA	CONVENTIONAL HANGAR	630.0'
32	NA	CONVENTIONAL HANGAR	630.0'
33	NA	CONVENTIONAL HANGAR	630.0'

ULTIMATE ELEVATIONS WILL VARY DUE TO FINAL GRADING AND DRAINAGE PLAN

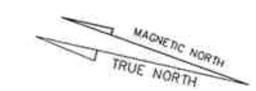
BUILDING TABLE

BLDG. #	DESCRIPTION		TOP ELEVATION
	EXISTING	ULTIMATE	
34	NA	CONVENTIONAL HANGAR	630.0'
35	NA	CONVENTIONAL HANGAR	630.0'
36	NA	CONVENTIONAL HANGAR	630.0'
37	NA	CONVENTIONAL HANGAR	630.0'
38	NA	CONVENTIONAL HANGAR	630.0'
39	NA	CONVENTIONAL HANGAR	630.0'
40	NA	CONVENTIONAL HANGAR	630.0'
41	NA	CONVENTIONAL HANGAR	619.0'
42	NA	CONVENTIONAL HANGAR	619.0'
43	NA	CONVENTIONAL HANGAR	619.0'
44	NA	CONVENTIONAL HANGAR	619.0'
45	NA	RELOCATED TERMINAL	646.0'
46	NA	CONVENTIONAL HANGAR	636.0'
47	NA	CONVENTIONAL HANGAR	636.0'
48	NA	CONVENTIONAL HANGAR	633.0'
49	NA	CONVENTIONAL HANGAR	632.0'
50	NA	CONVENTIONAL HANGAR	634.0'
51	NA	CONVENTIONAL HANGAR	634.0'
52	NA	CONVENTIONAL HANGAR	632.0'
53	NA	CONVENTIONAL HANGAR	632.0'
54	NA	CONVENTIONAL HANGAR	626.0'
55	NA	CONVENTIONAL HANGAR	626.0'
56	NA	CONVENTIONAL HANGAR	625.0'
57	NA	T-HANGARS	625.0'
58	NA	T-HANGARS	625.0'
59	NA	T-HANGARS	625.0'
60	NA	T-HANGARS	625.0'
61	NA	T-HANGARS	625.0'
62	NA	T-HANGARS	624.5'
63	NA	T-HANGARS	624.0'
64	NA	T-HANGARS	624.0'

ULTIMATE ELEVATIONS WILL VARY DUE TO FINAL GRADING AND DRAINAGE PLAN

LEGEND

	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE with FENCE		
AIRPORT REFERENCE POINT (ARP)		
WIND CONE AND SEGMENTED CIRCLE		
THRESHOLD LIGHTS		
C&G BEACON		
FENCE LINE		
TELEPHONE/POWER POLE LINE		
NONDIRECTIONAL BEACON (NDB)		
RWY END IDENTIFIER LIGHTS (REILS)		
VGSI		
BUILDING RESTRICTION LINE (BRL)		
GROUND CONTOURS		
SIGNIFICANT OBJECT LOCATION		
TREES/BRUSH		
ASOS		
HOLD POSITION AND SIGN		
SURVEY MARKERS		



MAGNETIC DECLINATION
4° 36' E (DECEMBER 2007)
ANNUAL RATE OF CHANGE
0° 7' W (DECEMBER 2007)

GRAPHIC SCALE

TEXAS DEPARTMENT OF TRANSPORTATION AVIATION DIVISION

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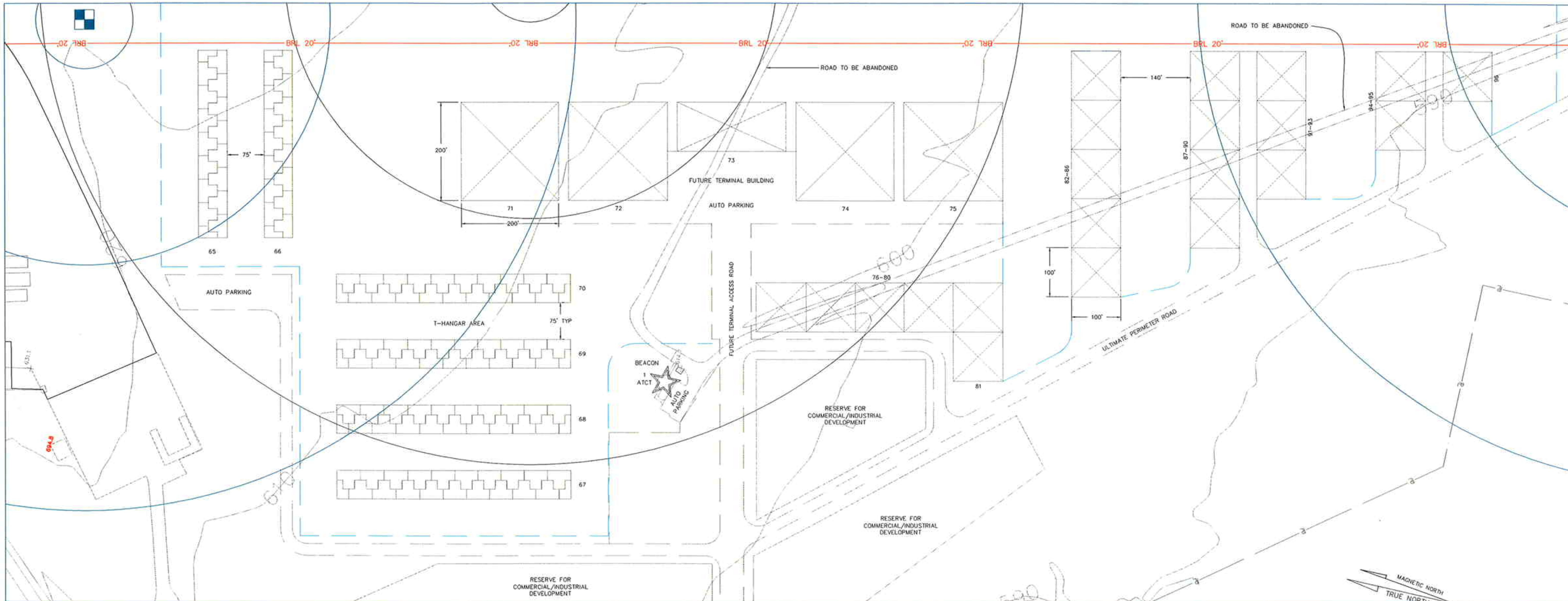
M. Quick	December 2007
DESIGNED BY	DATE
D. Hopkins	December 2007
DRAWN BY	DATE
M. Dmyterko	December 2007
CHECKED BY	DATE

TERMINAL AREA DRAWING – EAST
ARLINGTON MUNICIPAL AIRPORT
ARLINGTON, TEXAS

Texas Department of Transportation
Aviation Division



MAGNETIC DECLINATION
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0 50 100 200

GRAPHIC SCALE

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CAUTION ZONE LIGHTS ARE PRESENT AT ARLINGTON MUNICIPAL AIRPORT

BUILDING TABLE

BLDG. #	DESCRIPTION		TOP ELEVATION
	EXISTING	ULTIMATE	
1	ATCT	NA	724.1'
65	NA	CONVENTIONAL HANGAR	626.0'
66	NA	CONVENTIONAL HANGAR	626.0'
67	NA	T-HANGARS	622.0'
68	NA	T-HANGARS	622.5'
69	NA	T-HANGARS	623.0'
70	NA	T-HANGARS	623.5'
71	NA	CONVENTIONAL HANGAR	635.0'
72	NA	CONVENTIONAL HANGAR	635.0'
73	NA	FUTURE TERMINAL FACILITY	648.0'
74	NA	CONVENTIONAL HANGAR	635.0'
75	NA	CONVENTIONAL HANGAR	635.0'
76	NA	CONVENTIONAL HANGAR	634.0'
77	NA	CONVENTIONAL HANGAR	634.0'
78	NA	CONVENTIONAL HANGAR	634.0'
79	NA	CONVENTIONAL HANGAR	634.0'
80	NA	CONVENTIONAL HANGAR	634.0'
81	NA	CONVENTIONAL HANGAR	634.0'
82	NA	CONVENTIONAL HANGAR	635.0'
83	NA	CONVENTIONAL HANGAR	634.0'
84	NA	CONVENTIONAL HANGAR	634.0'
85	NA	CONVENTIONAL HANGAR	634.0'
86	NA	CONVENTIONAL HANGAR	634.0'
87	NA	CONVENTIONAL HANGAR	633.0'
88	NA	CONVENTIONAL HANGAR	633.0'
89	NA	CONVENTIONAL HANGAR	633.0'
90	NA	CONVENTIONAL HANGAR	633.0'
91	NA	CONVENTIONAL HANGAR	633.0'
92	NA	CONVENTIONAL HANGAR	633.0'
93	NA	CONVENTIONAL HANGAR	633.0'
94	NA	CONVENTIONAL HANGAR	632.0'
95	NA	CONVENTIONAL HANGAR	632.0'
96	NA	CONVENTIONAL HANGAR	632.0'

TOP ELEVATIONS FOR ULTIMATE STRUCTURES WILL BE CONTINGENT UPON A FINAL GRADING AND DRAINAGE PLAN

LEGEND

	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE with FENCE		
AIRPORT REFERENCE POINT (ARP)		
WIND CONE AND SEGMENTED CIRCLE		
THRESHOLD LIGHTS		
C&G BEACON		
FENCE LINE		
TELEPHONE/POWER POLE LINE		
NONDIRECTIONAL BEACON (NDB)		
RWY END IDENTIFIER LIGHTS (REILS)		
VGSI		
BUILDING RESTRICTION LINE (BRL)		
GROUND CONTOURS		
SIGNIFICANT OBJECT LOCATION		
TREES/BRUSH		
ASOS		
HOLD POSITION AND SIGN		
SURVEY MARKERS		

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TERMINAL AREA DRAWING – WEST
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Texas Department of Transportation
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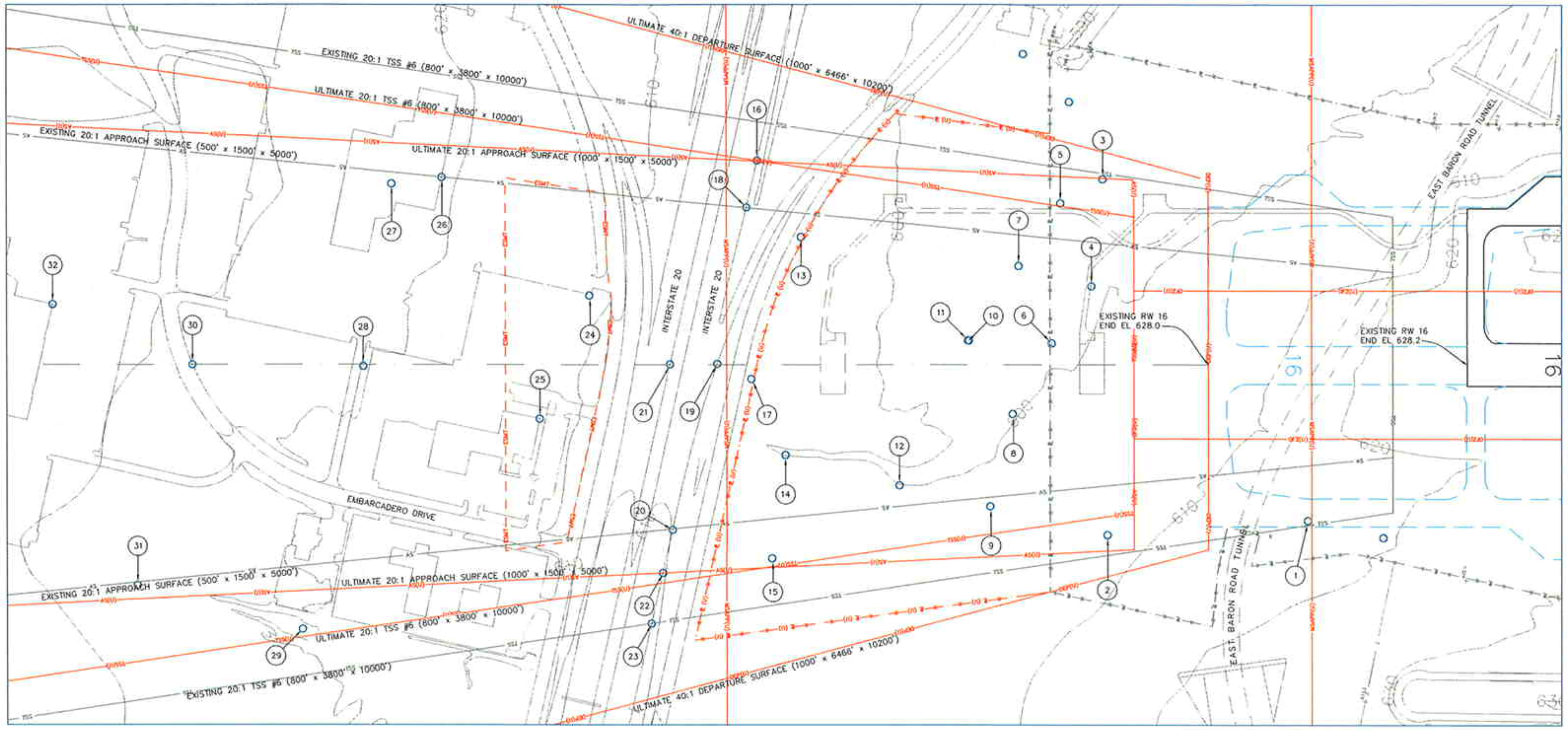
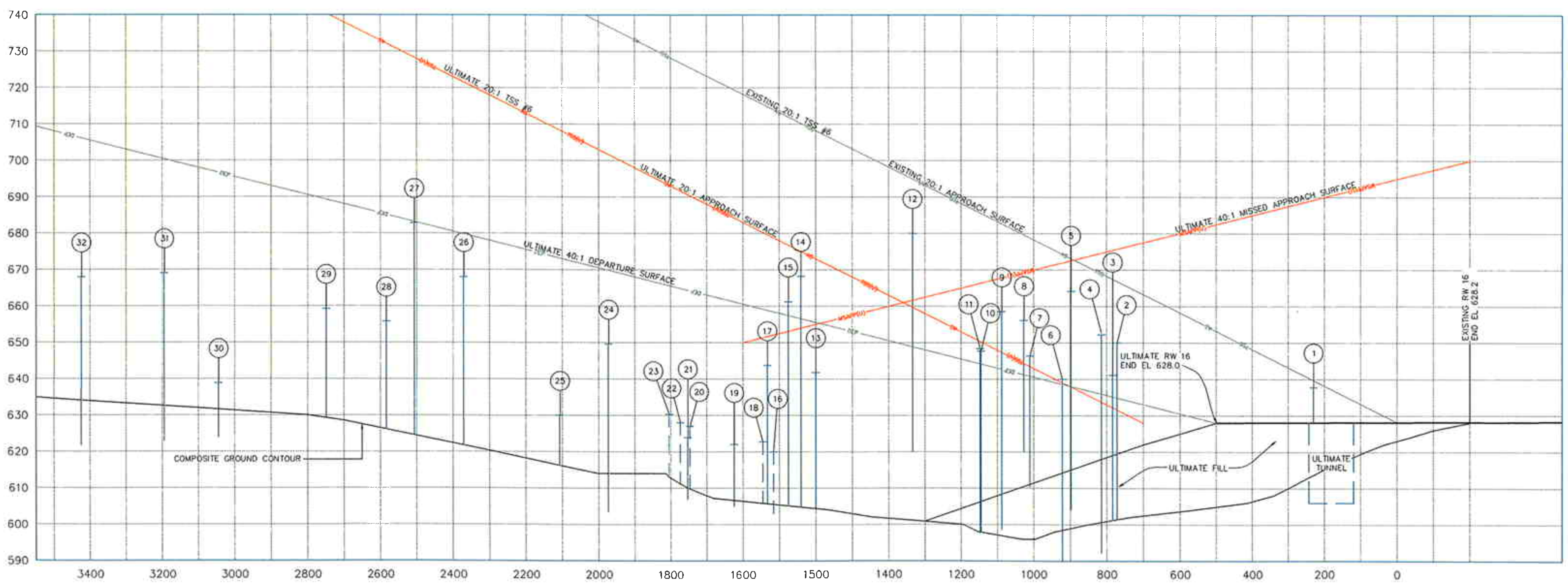


RW 16 PLAN



RW 16 PROFILE

IPASD Obstruction Table

No.	Object Description	Latitude	Longitude	Distance fm RW end	Offset fm RW C/L	Top Elevation	Amt of Penetration	Surface(s) Penetrated	REMEDIATION
1	TREE	32°40'22.66" N	97°05'52.67" W	430'	422' R	638'	16'/22'	X DS/U DS	TO BE REMOVED
2	TREE	32°40'27.83" N	97°05'54.43" W	272'	461' R	650'	18'/15'/20'	U AS/X DS/U DS	TO BE REMOVED
3	TREE	32°40'29.92" N	97°05'43.44" W	284'	501' R	641'	9'/6'/11'	U AS/X DS/U DS	REMOVE
4	TREE	32°40'29.62" N	97°05'46.83" W	1015'	212' L	652'	18'/16'/21'	U AS/X DS/U DS	REMOVE
5	TREE	32°40'30.89" N	97°05'44.46" W	1098'	437' L	664'	26'/26'/31'/14'	U AS/X DS/U DS/U MS	REMOVE
6	TREE	32°40'30.34" N	97°05'48.87" W	1122'	58' L	640'	1'/1'/1'/6'	U AS/U TSS/X DS/U DS	REMOVE
7	TREE	32°40'31.63" N	97°05'46.68" W	1211'	267' L	646'	3'/3'/5'/11'	U AS/U TSS/X DS/U DS	REMOVE
8	TREE	32°40'30.97" N	97°05'51.30" W	1227'	134' R	656'	12'/12'/15'/20'	U AS/U TSS/X DS/U DS	REMOVE
9	TREE	32°40'31.05" N	97°05'54.31" W	1288'	384' R	659'	11'/11'/16'/21'	U AS/U TSS/X DS/U DS	REMOVE
10	TREE	32°40'32.52" N	97°05'49.32" W	1345'	65' L	648'	4'/9'	X DS/U DS	REMOVE
11	TREE	32°40'32.55" N	97°05'49.32" W	1348'	66' L	648'	4'/9'	X DS/U DS	REMOVE
12	TREE	32°40'33.55" N	97°05'54.26" W	1535'	327' R	680'	20'/20'/31'/36'/19'	U AS/U TSS/X DS/U DS/ U MA	REMOVE
14	TREE	32°40'36.68" N	97°05'54.07" W	1841'	245' R	669'	12'/18'/15'	X DS/U DS/ U MA	REMOVE
15	TREE	32°40'36.46" N	97°05'57.36" W	1874'	525' R	661'	4'/9'/8'	X DS/U DS/U MA	REMOVE
27	BLDG	32°40'48.50" N	97°05'48.25" W	2907'	490' L	683'	5'	U DS	ADD OBS LIGHT

* ELEVATIONS ADJUSTED UPWARD 15' FOR PUBLIC ROADWAY, 17' FOR INTERSTATE HIGHWAY, 23' FOR RAILROADS
** OFFSETS ARE DESCRIBED RIGHT OR LEFT OF THE RUNWAY CENTERLINE AS SEEN BY A PILOT APPROACHING THE RUNWAY TO LAND
*** ALL DISTANCES FROM RUNWAY END ARE MEASURED FROM EXISTING RUNWAY END

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OBSTRUCTION LIGHTS TO BE ADDED AS SOON AS FEASIBLE.

OBJECTS PENETRATE DEPARTURE SURFACE LESS THAN 35'

TREES THAT PENETRATE EXISTING SURFACES TO BE REMOVED AS SOON AS FEASIBLE.

TREES THAT WILL PENETRATE ULTIMATE SURFACES TO BE REMOVED DURING CONSTRUCTION OF THE RUNWAY 16 EXTENSION.

GENERAL NOTES

A 405 OBSTRUCTION SURVEY WAS PERFORMED 09/25/2006 BY GEODETIX, INC., SAN ANTONIO, TX.

THE EXISTING HEIGHT HAZARD ZONING ORDINANCE FOR THIS AIRPORT WAS ADOPTED ON 1 DECEMBER 2002. ZONED 6080', 16 NPI, 34 PIA.

HORIZONTAL DATUM NAD 83 STATE PLANE, TEXAS CENTRAL FIPS 4202 SURVEY FEET; VERTICAL DATUM NAVD 88. DO NOT APPLY CORRECTION FACTOR.

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TRUE NORTH

MAGNETIC DECLINATION
4° 36' E (DECEMBER 2007)
ANNUAL RATE OF CHANGE
0° 7' W (DECEMBER 2007)

LEGEND

	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE w/FENCE		
FENCE LINE		
THRESHOLD LIGHTS		
RW END IDENTIFIER LIGHTS (REILS)		
GROUND CONTOURS		
SIGNIFICANT OBJECT LOCATION		
TREES/BRUSH		

0 100 200 400 600
HORIZONTAL SCALE IN FEET

0 10 20 40 60
VERTICAL SCALE IN FEET

TEXAS DEPARTMENT OF TRANSPORTATION AVIATION DIVISION

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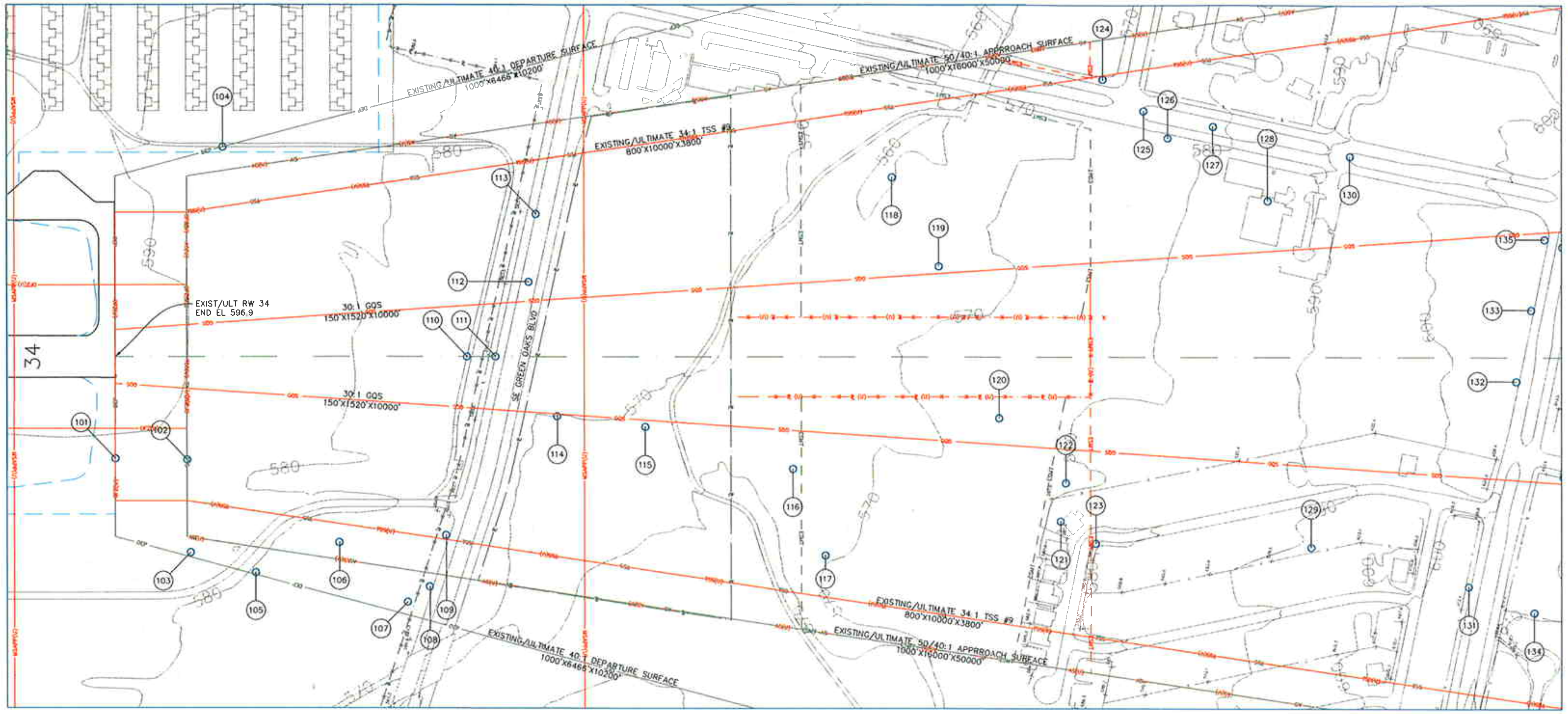
Coffman Associates
Airport Consultants
www.coffmanassociates.com

M. Quick (DESIGNED BY)	December 2007 (DATE)
D. Hopkins (DRAWN BY)	December 2007 (DATE)
M. Dmyterko (CHECKED BY)	December 2007 (DATE)

RUNWAY 16 IPASD
ARLINGTON MUNICIPAL AIRPORT
ARLINGTON, TEXAS

Texas Department of Transportation Aviation Division



RW 34 PLAN

IPASD Obstruction Table

No.	Object Description	Latitude	Longitude	Distance fm RW end	Offset fm RW C/L	Top Elevation	Amt of Penetration	Surface(s) Penetrated	REMEDIATION
103	TREE	32°39'19.93" N	97°15'35.27" W	209'	543' L	606'	3'	DS	TRIM OR REMOVE
105	TREE	32°39'15.50" N	97°05'37.93" W	390'	599' L	615'	7'	DS	TRIM OR REMOVE
106	TREE	32°39'13.45" N	97°05'36.42" W	620'	515' L	611'	6'/1'	XU AS	TRIM OR REMOVE
107	TREE	32°39'11.29" N	97°05'37.82" W	808'	680' L	621'	4'/12'	DS/U MA	TRIM OR REMOVE
108	POLE	32°39'10.79" N	97°05'37.22" W	868'	637' L	618'	10'	U MA	REMOVE POLE, ENCAPSULATE AND BURY CABLE
109	POLE	32°39'10.64" N	97°05'35.47" W	914'	495' L	611'	5'	U MA	REMOVE
112	POLE	32°39'09.85" N	97°05'26.88" W	1145'	207 R	607'	6'	U MA	REMOVE
115	TREE	32°39'05.91" N	97°05'30.69" W	1467'	194' L	624'	2'/27'	XU AS	REMOVE

* ELEVATIONS ADJUSTED UPWARD 15' FOR PUBLIC ROADWAY, 17' FOR INTERSTATE HIGHWAY, 23' FOR RAILROADS
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TREES TO BE TRIMMED OR REMOVED PRIOR TO GRANTING THE ULTIMATE APPROACH.

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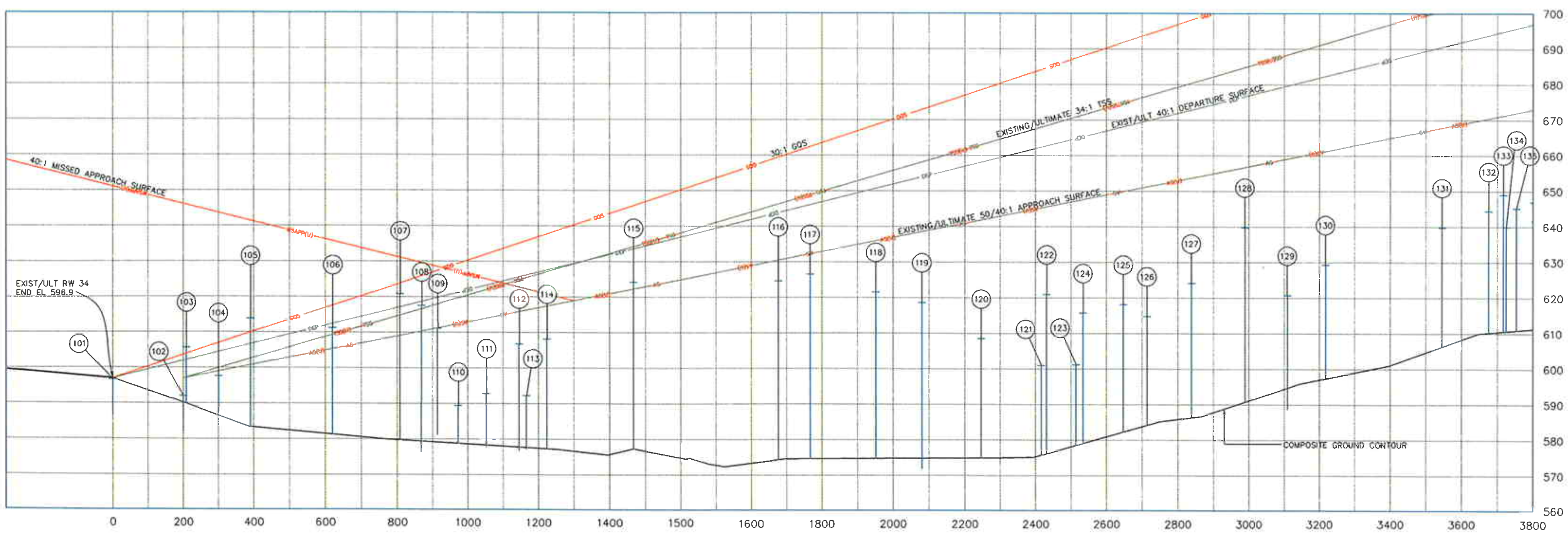
4° 36' E (DECEMBER 2007)
ANNUAL RATE OF CHANGE
0° 7' W (DECEMBER 2007)

LEGEND

	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		(U)
AIRPORT PROPERTY LINE w/FENCE		(U)
FENCE LINE		
THRESHOLD LIGHTS		
RW END IDENTIFIER LIGHTS (REILS)		
GROUND CONTOURS		
SIGNIFICANT OBJECT LOCATION		
TREES/BRUSH		

0 100 200 400 600
HORIZONTAL SCALE IN FEET

0 10 20 40 60
VERTICAL SCALE IN FEET



RW 34 PROFILE

TEXAS DEPARTMENT OF TRANSPORTATION AVIATION DIVISION

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D. Hopkins	December 2007
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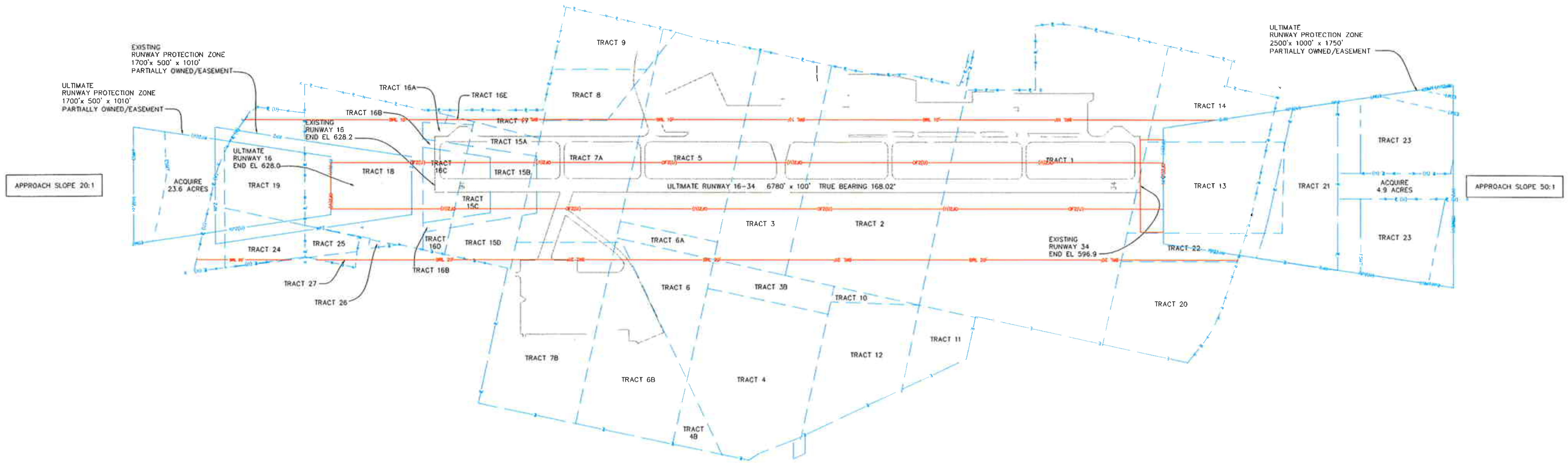
CHECKED BY	DATE

RUNWAY 34 IPASD
ARLINGTON MUNICIPAL AIRPORT
ARLINGTON, TEXAS

Texas Department of Transportation
Aviation Division



LEGEND

	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE with FENCE		
BUILDING RESTRICTION LINE (BRL)		
PARCEL LINES		
RUNWAY PROTECTION ZONE (RPZ)		

GENERAL NOTES

SURVEY MAPPING PERFORMED SEPTEMBER 25, 2006 BY GEODETIX, INC., SAN ANTONIO, TX.

EXISTING RUNWAY END ELEVATIONS, AND BEARINGS NOTED IN THIS ALP SUPPLIED BY ASIS DATASHEET SYSTEM, http://avnwww.jccbi.gov/datasheet/. HORIZONTAL DATUM NAD 83 STATE PLANE, TEXAS CENTRAL FIPS 4202 SURVEY FEET; VERTICAL DATUM NAVD 88. DO NOT APPLY CORRECTION FACTOR.

MAGNETIC NORTH
TRUE NORTH

MAGNETIC DECLINATION
4° 36' E (DECEMBER 2007)
ANNUAL RATE OF CHANGE
0° 7' W (DECEMBER 2007)

0 500 1000 2000
GRAPHIC SCALE

PROPERTY DATA

TRACT	ACRES	TITLE	GRANTOR	VOLUME/PAGE	DATE	FUNDING
1	100.0	FEE SIMPLE	JOHN B. GARRETT	3344/307	7/16/1959	FAAP 9-41-167-6201
2	51.97	FEE SIMPLE	JAMES T. WAGONER & R.S. WAGONER, JR	3671/545	4/23/1962	FAAP 9-41-167-6201
3	34.24	FEE SIMPLE	BARDIN & HILL	3493/185	4/13/1964	FAAP 9-41-167-D403
3B	6.17	FEE SIMPLE	BARDIN & HILL	3493/185	4/13/1964	FAAP 9-41-167-D403
4	34.26	FEE SIMPLE	JOHN B. GARRETT	3400/407	6/10/1959	
4B	3.17	FEE SIMPLE	CITY OF ARLINGTON	3400/407	11/15/1967	RELEASED FROM FAAP THROUGH SWAP WITH SHERWOOD E. BLOUNT, JR. FOR 1.236 ACRES IN TRACT 10
5	34.05	FEE SIMPLE	JOHN B. GARRETT	3400/407	6/10/1959	FAAP 9-43-167-6201
6	34.07	FEE SIMPLE	BARDIN & HILL	3493/185	10/5/1960	FAAP 9-41-167-D403
6A	3.332	FEE SIMPLE	CITY OF ARLINGTON	3493/185		FAAP 9-41-167-6201
6B	21.76	FEE SIMPLE	CITY OF ARLINGTON	3493/185	11/15/1967	RELEASED FROM FAAP FOR AVIATION INDUSTRIAL USE (BELL HELICOPTER /TEXTRON LEASE OF PROPERTY)
7A	22.659	FEE SIMPLE	JOHN B. GARRETT	3400/410	6/10/1959	FAAP 9-41-167-6201
7B	29.05	FEE SIMPLE	JOHN B. GARRETT	3400/410	6/10/1959	FAAP 9-41-167-D403, RELEASED FROM FAAP FOR AVIATION INDUSTRIAL USE (BELL HELICOPTER/TEXTRON LEASE OF PROPERTY)
8	6.772	FEE SIMPLE	TRINITY RIVER AUTHORITY	6672/276	1/31/1979	OBTAINED THROUGHT SWAP WITH TRA IN TRACT 1A A.I.P. 5-48-0010-04
9	10.137	FEE SIMPLE	TRINITY RIVER AUTHORITY	6722/2180	1/31/1979	A.I.P. 5-48-0010-04
10	1.236	FEE SIMPLE	SHERWOOD E. BLOUNT, JR	8827/724	1/29/1987	OBTAINED THROUGH SWAP WITH SHERWOOD E. BLOUNT, JR. IN TRACT 4A, A.I.P. 3-48-0010-02
11	7.01	FEE SIMPLE	GARY L. HIGHTOWER	9726/1329	10/10/1989	REIMBURSED 0502 ARLING
12	23.278	FEE SIMPLE	BARDIN RD. VENTURES	9855/1079	3/1/1990	REIMBURSED 0502 ARLING
13	23.206	FEE SIMPLE	MIDDLE EAST INVESTMENTS	9597/1898	5/19/1989	A.I.P. 3-48-0010-03
14	16.428	FEE SIMPLE	AMER. FEDERAL SAVINGS BANK	10263/2348	5/22/1991	NO FEDERAL GRANT

PROPERTY DATA

TRACT	ACRES	TITLE	GRANTOR	VOLUME/PAGE	DATE	FUNDING
15	15.908 TOTAL ACRES SUBDIVIDED AMONG TRACTS 15A THROUGH 15D	FEE SIMPLE	ROY W. LOWE	10133/64	12/27/2009	PARCELS WITHIN TRACT 15 HAVE BEEN REIMBURSED IN A.I.P. 3-48-0010-06, 3-48-0010-10, 9742 ARLING, AND 0302 ARLING
15A	2.8886	FEE SIMPLE	CITY OF ARLINGTON			REIMBURSED IN A.I.P. 3-48-0010-10
15B	5.3801	FEE SIMPLE	CITY OF ARLINGTON			REIMBURSED IN A.I.P. 3-48-0010-06
15C	3.1993	FEE SIMPLE	CITY OF ARLINGTON			REIMBURSED IN TXDOT 9742ARLING
15D	4.44	FEE SIMPLE	CITY OF ARLINGTON			REIMBURSED 0302 ARLING
16	8.258 TOTAL ACRES SUBDIVIDED AMONG TRACTS 15A THROUGH 15D	FEE SIMPLE	ROY W. LOWE	10133/72	12/27/2009	PARCELS WITHIN TRACT 16 HAVE BEEN REIMBURSED IN A.I.P. 3-48-0010-06, AND 3-48-0010-08, AND 0302 ARLING
16A	2.001	FEE SIMPLE	CITY OF ARLINGTON			REIMBURSED IN A.I.P. 3-48-0010-08
16B	0.692	FEE SIMPLE	CITY OF ARLINGTON			REIMBURSED IN A.I.P. 3-48-0010-06
16C	4.121	FEE SIMPLE	CITY OF ARLINGTON			REIMBURSED 0302 ARLING
16D	1.20	FEE SIMPLE	CITY OF ARLINGTON			REIMBURSED 0302 ARLING
16E	0.244	FEE SIMPLE	CITY OF ARLINGTON			REIMBURSED 0302 ARLING
17	2.465	FEE SIMPLE	MORITZ INTERESTS LTD. & ZZ LAND HOLDINGS	11849/983 & 979	1/11/95	REIMBURSED 0402 ARLING
18	28.192	FEE SIMPLE	ROY W. LOWE	12448/1655	7/25/96	REIMBURSED 0402 ARLING
19	14.102	FEE SIMPLE	ROY W. LOWE	12448/1655	7/25/96	REIMBURSED 0402 ARLING
20	18.549	FEE SIMPLE	GUARANTEE FEDERAL SAVINGS BANK	12074/288	8/22/95	REIMBURSED 0502 ARLING
21	15.968	FEE SIMPLE	GUARANTEE FEDERAL SAVINGS BANK	12074/288	8/22/95	REIMBURSED 0502 ARLING
22	5.865	FEE SIMPLE	GUARANTEE FEDERAL SAVINGS BANK	12074/288	8/22/95	REIMBURSED 0502 ARLING
23	32.362	EASEMENT	CITY OF ARLINGTON	7354/1512	9/21/2000	NO FEDERAL GRANT
24	6.406	EASEMENT	BELL HELICOPTER-TEXTRON	14052/375001	10/14/99	REIMBURSED 0402 ARLING
25	2.182	FEE SIMPLE	BELL HELICOPTER-TEXTRON	14052/375001	10/14/99	REIMBURSED 0402 ARLING
26	0.271	FEE SIMPLE	BELL HELICOPTER-TEXTRON	14052/375001	10/14/99	REIMBURSED 0402 ARLING
27	0.789	FEE SIMPLE	BELL HELICOPTER-TEXTRON	14052/375001	10/14/99	REIMBURSED 0402 ARLING

TEXAS DEPARTMENT OF TRANSPORTATION AVIATION DIVISION

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M. Quick — December 2007
DESIGNED BY — DATE
D. Hopkins — December 2007
DRAWN BY — DATE
M. Dmyterko — December 2007
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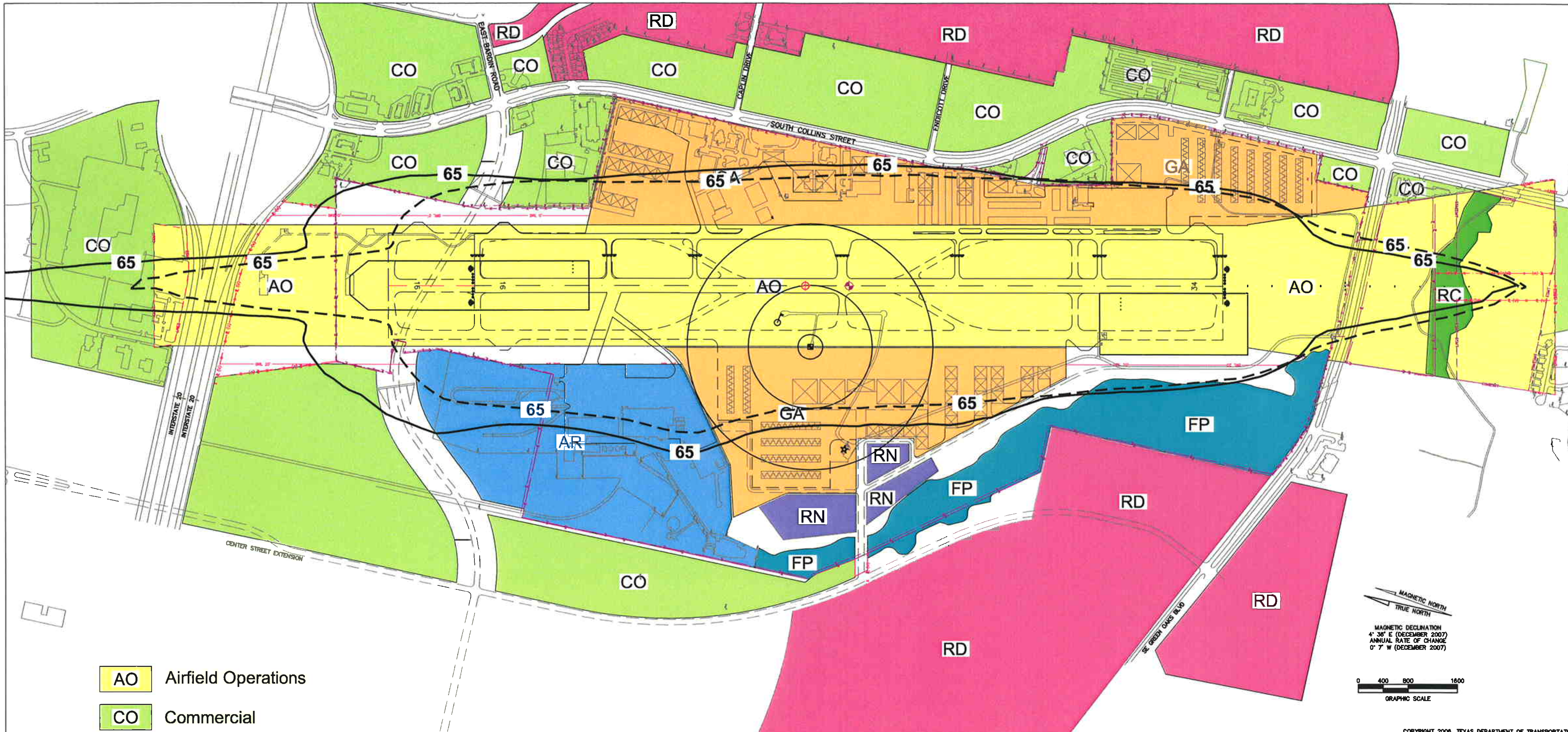
AIRPORT PROPERTY MAP
ARLINGTON MUNICIPAL AIRPORT
ARLINGTON, TEXAS

Texas Department of Transportation
Aviation Division



AO	Airfield Operations
CO	Commercial
GA	General Aviation
RN	Non Aviation Related Revenue Support
AR	Aviation Related Revenue Support
RC	Recreational
RD	Residential
FP	Flood Plain

- - 65 - - Existing Noise Contours

—— 65 —— Ultimate Noise Contours

GENERAL NOTES

THE EXISTING HEIGHT HAZARD ZONING ORDINANCE FOR THIS AIRPORT WAS ADOPTED 1 DECEMBER 2002. ZONED 6080' x 100', RW 16 NPI; RW 34 PIA.

TEXAS DEPARTMENT OF TRANSPORTATION AVIATION DIVISION

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M. Quick — DESIGNED BY	December 2007 — DATE
D. Hopkins — DRAWN BY	December 2007 — DATE
M. Dmyterko — CHECKED BY	December 2007 — DATE

AIRPORT LAND USE
ARLINGTON MUNICIPAL AIRPORT
ARLINGTON, TEXAS

Texas Department of Transportation Aviation Division

Arlington Municipal Airport

Chapter Six

FINANCIAL PLAN

FINANCIAL PLAN

CHAPTER 6

The analyses conducted in previous chapters outlined airport development needs to meet projected aviation demand for the next 20 years. Alternatives were evaluated which considered long term layouts to meet the projected facility needs. It is important to note that these needs were tied to planning milestones which could occur as projected; however, it is likely that the demand will fluctuate. Based upon the expanding nature of the Dallas/Fort Worth Metroplex, aviation demand will likely follow similar expansion. One of the most important elements of the master planning process is the application of basic economic, financial, and management rationale to each development item so that the feasibility of implementation can be assured. The purpose of this chapter is to identify capital needs at Arlington Municipal Airport and identify when these should be implemented according to need, function, and demand.

The presentation of the financial plan and its feasibility has been organized into three sections. First, the airport's capital needs, based on the projected capital improvement program (CIP), are presented in narrative and graphic form. Second, funding sources on the federal, state, and local levels are identified and discussed. Finally, the chapter presents a cash flow analysis which analyzes the financial feasibility of the recommended CIP.

DEMAND-BASED PLAN

The master plan for Arlington Municipal Airport has been developed according to a demand-based schedule. De-

mand-based planning establishes planning guidelines for the airport based upon airport activity levels instead of guidelines based upon subjective factors such as points in time. By doing so, the levels of activity derived from the demand forecasts can be related to the actual capital investments needed to safely and efficiently accommodate the level of demand being experienced at the airport. More specifically, the intention of this master plan is that the facility improvements needed to serve new levels of demand should only be implemented when the levels of demand experienced at the airport justify their implementation.

As discussed, most development items included in the recommended concept will need to follow demand indicators. For example, the plan includes the construction of new hangar aprons, taxilanes, and T-hangars. Based aircraft will be the indicator for additional hangar needs. If based aircraft growth occurs as projected, additional hangars will need to be constructed to meet the demand. If growth slows or does not occur as projected, hangars and pavement projects can be delayed. As a result, capital expenditures will be undertaken as needed, which leads to a responsible use of capital assets. Some development items do not correspond specifically to actual demand levels, such as maintenance. Maintenance projects are typically associated with day-to-day operations or aging factors and should be monitored and identified by airport management.

A demand-based master plan does not specifically require the implementation of any of the demand-based improvements. Instead, it is envisioned that implementation of any master plan improvement would be examined against the demand levels prior to implementation. In many ways, this master plan is similar to a community's general plan. The master plan establishes a plan for the use of airport facilities consistent with the potential aviation needs and capital needs required to support that use. However, individual projects in the plan are not implemented until the need is demonstrated and the project is approved for funding.

AIRPORT DEVELOPMENT SCHEDULE AND COST SUMMARIES

Once the specific needs for the airport have been established, the next step is to determine a realistic capital improvement schedule and associated costs for implementing the plan. This section will identify these projects and the overall cost of each item in the development plan. The program outlined in the following pages has been evaluated from a variety of perspectives and represents the culmination of a comparative analysis of basic budget factors, demand, and priority assignments.

The recommended improvements are grouped by the planning horizons, short term, intermediate term, and long term. Each year, Arlington Municipal Airport will need to re-examine the priorities for funding, adding or removing projects on the capital programming lists. **Table 6A** summarizes the key milestones for each of the three planning horizons.

TABLE 6A
Planning Horizon Milestone Summary
Arlington Municipal Airport

	Current	Short Term	Intermediate Term	Long Term
ANNUAL OPERATIONS				
Total Itinerant	70,600	78,650	88,000	103,450
Total Local	81,100	89,000	90,700	94,100
Total Operations	**151,700**	**167,650**	**178,700**	**197,550**
BASED AIRCRAFT				
Single Engine	209	230	250	272
Multi-Engine	57	56	55	54
Turboprop	12	15	18	31
Jet	6	10	15	28
Helicopter	15	17	19	22
Tilt Rotor	2	2	3	3
Total Based Aircraft	**301**	**330**	**360**	**410**
Total AIAs	**184**	**790**	**880**	**1,035**

AIA: Annual Instrument Approach

While some projects will be demand-based, others will be dictated by design standards, safety, or rehabilitation needs. In putting together a listing of projects, an attempt has been made to include anticipated rehabilitation needs through the planning period and capital replacement needs.

Exhibit 6A summarizes the CIP for Arlington Municipal Airport through the planning period of this master plan. An estimate has been included with each project of federal and state funding eligibility, although this amount is not guaranteed. **Exhibit 6B** graphically depicts development staging. As a master plan is a conceptual document, implementation of these capital projects should only be undertaken after further refinement of their design and costs through architectural and engineering analyses. Moreover, projects could require wastewater and drainage improvements. The financial plan addresses this concern, but any future development should include analysis of the capacity of the infrastructure to support the growth.

The cost estimates presented in this chapter have been increased to allow for contingencies that may arise on the project. Capital costs presented here should be viewed only as estimates subject to further refinement during design. Nevertheless, these estimates are considered sufficiently accurate for planning purposes. Cost estimates for each of the development projects listed in the CIP are listed in current (2007) dollars. Adjustments will need to be applied over time as construction costs or capital equipment costs change.

In an effort to further identify capital needs at the airport, the proposed projects can be categorized as follows:

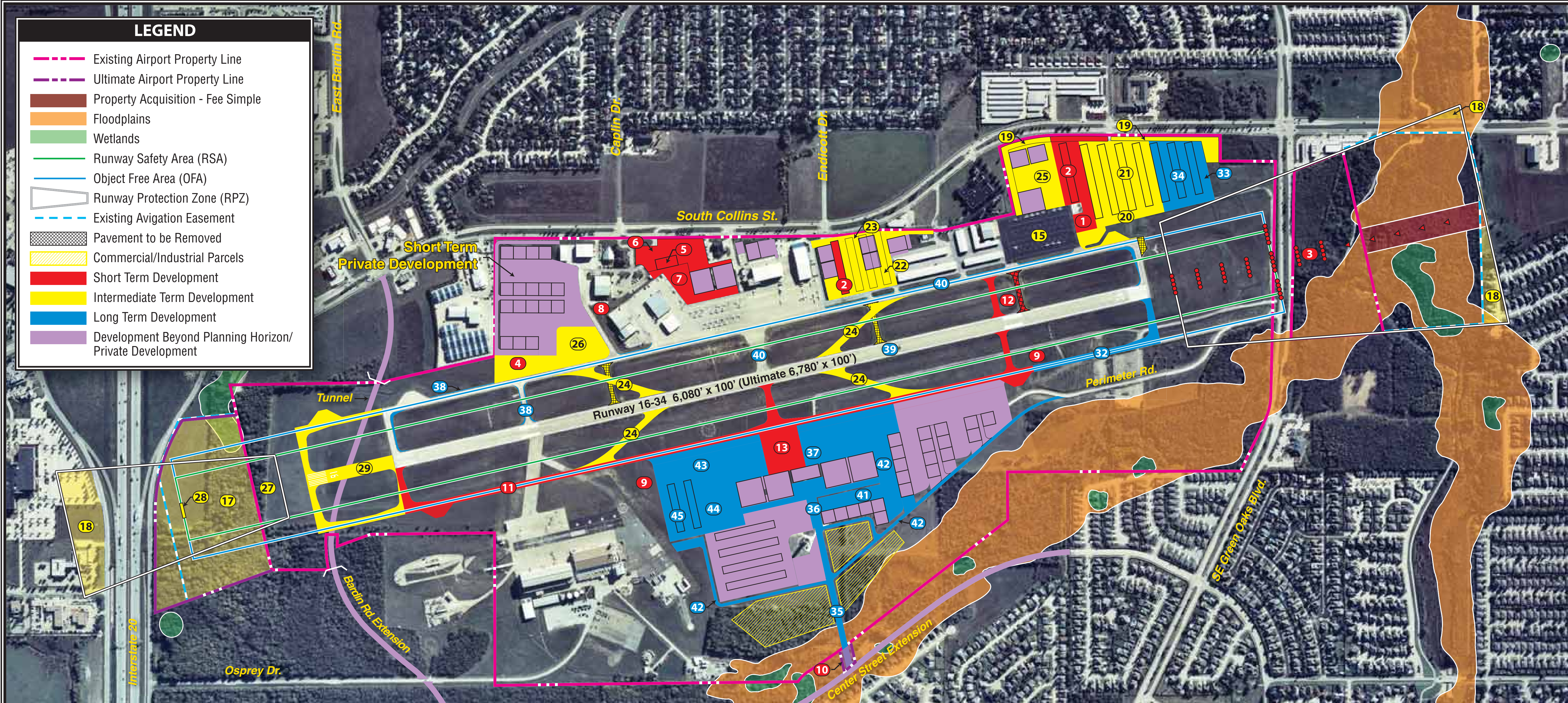
06MP10-6A-8/29/07

	PROJECT COST	TxDOT / FAA ELIGIBLE	LOCAL SHARE
SHORT TERM PROGRAM (0-5 YEARS)			
1. Improve Infrastructure and Utilities for Southeast Development Area	$1,221,000	$693,900	$527,100
2. Remove Damaged T-Hangar / Construct New T-Hangar (1 Building / 20 Units)	820,000	0	820,000
3. Environmental Assessment and Installation of MALSR*	1,600,000	1,600,000	0
4. Construct Taxiway Providing Access to Northeast Development Area	248,800	223,920	24,880
5. New Terminal Building Design and Consruction	4,000,000	600,000	3,400,000
6. Airport Perimeter Landscaping	135,000	50,000	85,000
7. Construct Corporate Itinerant Aircraft Parking Apron & Terminal Apron (19,370 sq. yds)	2,800,000	2,520,000	280,000
8. Construct Internal Support Vehicle Access Road	250,000	50,000	200,000
9. Relocate ASOS	125,000	112,500	12,500
10. Acquire Land for West Side Access Road Right-of-Way	64,700	0	64,700
11. Construct West Side Parallel Taxiway to 75' Wide - Phase I	6,538,430	5,884,587	653,843
12. Relocate East Side Taxiway B	303,550	273,195	30,355
13. Construct Large Aircraft Overflow Apron on West Side Development Area (10,000 sq. yds)	1,224,080	1,101,672	122,408
14. Miscellaneous RAMP Projects	300,000	150,000	150,000
SHORT TERM PROGRAM TOTALS (0-5 YEARS)	***$19,630,560***	***$13,259,774***	***$6,370,786***
INTERMEDIATE TERM PROGRAM (6-10 YEARS)			
15. Reconstruct / Strengthen South Ramp Apron Area (24,500 sq. yds)	$2,866,500	$2,579,850	$286,650
16. Environmental Assessment for Runway Extension	150,000	135,000	15,000
17. Acquire 24.4 Acres of Land North of Runway (Safety Areas, Approach Protection, Buffer)	4,889,175	4,400,257	488,918
18. Acquire 7.9 Acres of Avigation Easement for Runway Approach Protection	1,266,375	1,139,737	126,638
19. Expand Auto Access Roads and Parking in Southeast Development Area	312,520	50,000	262,520
20. Construct Additional Apron / Taxilanes for T-Hangar Development in Southeast Area	2,242,500	2,018,250	224,250
21. Construct T-Hangars in Southeast Development Area (4 Buildings / 80 Units)	3,200,000	0	3,200,000
22. Remove T-Hangars (4 Buildings / 76 Units)	76,000	0	76,000
23. Improve Apron for Hangar Development and Aircraft Parking / Expand Auto Access Road	2,299,050	2,042,145	256,905
24. Construct High-Speed Taxiway Exits/Remove Taxiways C and E	1,631,500	1,468,350	163,150
25. Construct Additional Apron for Hangar Development and Aircraft Access (10,700 sq. yds)	1,279,720	1,151,748	127,972
26. Construct Additional Apron for Aircraft Parking (15,330 sq. yds)	1,868,100	1,681,290	186,810
27. Earthwork / Site Preparation for Runway and Parallel Taxiway Extension to North	1,000,000	900,000	100,000
28. Relocate Localizer	750,000	750,000	0
29. Extend Runway and Parallel Taxiways 700' North	2,791,360	2,512,224	279,136
30. Update Airport Master Plan	250,000	225,000	25,000
31. Miscellaneous RAMP Projects	332,500	166,250	166,250
INTERMEDIATE TERM PROGRAM TOTALS (6-10 YEARS)	***$27,205,300***	***$21,220,101***	***$5,985,199***
LONG TERM PROGRAM (11-20 YEARS)			
32. Construct Remainder of West Side Parallel Taxiway - Phase II	$1,399,320	$1,259,388	$139,932
33. Construct Additional Apron / Taxilanes for T-Hangar Development in Southeast Area	1,538,680	1,384,812	153,868
34. Construct T-Hangars in Southeast Development Area (3 Buildings / 60 Units)	2,400,000	0	2,400,000
35. Construct West Aide Access Road from Center Street Extension, Terminal Roads, & Parking	817,440	50,000	767,440
36. Expand Utilities for West Side Development Area - Phase I	731,250	0	731,250
37. Construct West Side Terminal Area - Phase I (Apron & Taxilanes)	3,708,900	3,338,010	370,890
38. Widen Taxiways A and F to 50' to Accomodate ADG III Aircraft	524,160	471,744	52,416
39. Reconstruct / Strenthen Runway 16-34 to 120,000 Pounds DWL	8,062,015	7,255,813	806,202
40. Reconstruct / Strengthen East Side Taxiways to 120,000 Pounds DWL	4,989,530	4,490,577	498,953
41. Expand Utilities for West Side Development Area - Phase II	468,000	0	468,000
42. Construct Additional Terminal Roads and Parking	281,320	50,000	231,320
43. Expand West Side Terminal Area - Phase II (Apron and Taxilanes)	6,602,700	5,942,430	660,270
44. Construct Additional Apron / Taxilanes for T-Hangar Development and Aircraft Parking on West Side	2,050,815	1,845,733	205,082
45. Construct T-Hangars on West Side (2 Buildings / 40 Units)	1,600,000	0	1,600,000
46. Miscellaneous RAMP Projects	800,000	400,000	400,000
LONG TERM PROGRAM TOTALS (11-20 YEARS)	***$35,974,130***	***$26,488,507***	***$9,485,623***
TOTAL PROGRAM COST	***$82,809,990***	***$60,968,382***	***$21,841,608***

*Project to be funded by FAA F&E Program

Exhibit 6A
CAPITAL IMPROVEMENT PROGRAM

06MP10-6B-8/29/07



SHORT TERM PROGRAM

1. Improve Infrastructure and Utilities for Southeast Development Area
2. Remove Damaged T-Hangar / Construct New T-Hangar (1 Building / 20 Units)
3. Environmental Assessment and Installation of MALSR
4. Construct Taxiway Providing Access to Northeast Development Area
5. New Terminal Building Design and Consruction
6. Airport Perimeter Landscaping
7. Construct Corporate Itinerant Aircraft Parking Apron (7,700 sq. yds)
8. Construct Internal Support Vehicle Access Road
9. Relocate ASOS
10. Acquire Land for West Side Access Road Right-of-Way
11. Construct West Side Parallel Taxiway to 75' Wide - Wide
12. Relocate East Side Taxiway B
13. Construct Large Aircraft Overflow Apron on West Side Development Area (10,000 sq. yds)
14. Miscellaneous RAMP Projects

INTERMEDIATE TERM PROGRAM

15. Reconstruct / Strengthen South Ramp Apron Area (24,500 sq. yds)
16. Environmental Assessment for Runway Extension
17. Acquire 24.4 Acres of Land North of Runway (Safety Areas, Approach Protection, Buffer)
18. Acquire 7.9 Acres of Avigation Easement for Runway Approach Protection
19. Expand Auto Access Roads and Parking in Southeast Development Area
20. Construct Additional Apron / Taxilanes for T-Hangar Development in Southeast Area
21. Construct T-Hangars in Southeast Development Area (4 Buildings / 80 Units)
22. Remove T-Hangars (4 Buildings / 76 Units)
23. Improve Apron for Hangar Development and Aircraft Parking / Expand Auto Access Road
24. Construct High-Speed Taxiway Exits / Remove Taxiways C and E
25. Construct Additional Apron for Hangar Development and Aircraft Access (10,700 sq. yds)
26. Construct Additional Apron for Aircraft Parking (15,330 sq. yds)
27. Earthwork / Site Preparation for Runway and Parallel Taxiway Extension to North
28. Relocate Localizer
29. Extend Runway and Parallel Taxiways 700' North
30. Update Airport Master Plan
31. Miscellaneous RAMP Projects

LONG TERM PROGRAM

32. Construct Remainder of West Side Parallel Taxiway - Phase II
33. Construct Additional Apron / Taxilanes for T-Hangar Development in Southeast Area
34. Construct T-Hangars in Southeast Development Area (3 Buildings / 60 Units)
35. Construct West Side Access Road from Center Street Extension, Terminal Roads, & Parking
36. Expand Utilities for West Side Development Area - Phase I
37. Construct West Side Terminal Area - Phase I (Apron & Taxilanes)
38. Widen Taxiways A and F to 50' to Accomodate ADG III Aircraft
39. Reconstruct / Strenthen Runway 16-34 to 120,000 Pounds DWL
40. Reconstruct / Strengthen East Side Taxiways to 120,000 Pounds DWL
41. Expand Utilities for West Side Development Area - Phase II
42. Construct Additional Terminal Roads and Parking
43. Expand West Side Terminal Area - Phase II (Apron and Taxilanes)
44. Construct Additional Apron / Taxilanes for T-Hangar Development and Aircraft Parking on West Side
45. Construct T-Hangars on West Side (2 Buildings / 40 Units)
46. Miscellaneous RAMP Projects

NORTH

0 800
SCALE IN FEET

Date of Aerial Photography: 10-28-2006

Arlington Municipal Airport

Exhibit 6B
DEVELOPMENT STAGING

1) **Safety/Security (SS)** – these are capital needs considered necessary for operational safety and protection of aircraft and/or people and property on the ground near the airport.

2) **Environmental (EN)** – these are capital needs which are identified to enable the airport to operate in an environmentally acceptable manner or meet needs identified in the Environmental Evaluation (Appendix B).

3) **Maintenance (MN)** – these are capital needs required to maintain the existing infrastructure at the airport.

4) **Efficiency (EF)** – these are capital needs intended to optimize aircraft ground operations or passengers' use of the terminal building.

5) **Demand (DM)** – these are capital needs required to accommodate levels of aviation demand. The implementation of these projects should only occur when demand for these needs is verified.

6) **Opportunities (OP)** – these are capital needs intended to take advantage of opportunities afforded by the airport setting. Typically, this will involve improvements to property intended for lease to aviation-related commercial and industrial developments. In most cases, projects under this category will be listed as intermediate or long term to be implemented as marketing opportunities present themselves.

Each capital need is categorized according to this schedule. The applicable category (or categories) included are presented in **Table 6B**.

A major focus in the short term period is placed on demand and safety and security. Items include the development of specific areas of the airport for hangars, aircraft parking, and terminal facilities. Also included is the construction of automobile access roads to better separate the mix of aircraft and vehicular traffic.

Intermediate term improvements continue to focus on projects related to growth and development such as a runway extension and additional hangars. There are also several safety-related projects that deal with the acquisition of land surrounding the airport to provide a buffer between the airport and persons and property adjacent to the airport. Finally, allowance is provided for pavement rehabilitation and maintenance projects.

Long term improvements relate to the development of the west side of the airport. Demand will dictate the timeframe and to what extent this area will be developed. It is during this time that major maintenance projects related to the reconstruction of Runway 16-34 and existing taxiways is scheduled. The following subsections discuss the capital needs program in more detail, breaking down the projects by short, intermediate, and long term planning horizons.

TABLE 6B
Development Needs by Category
Arlington Municipal Airport

	PROJECT DESCRIPTION	CATEGORY
	SHORT TERM PROGRAM (0-5 YEARS)	
1	Improve Infrastructure and Utilities for Southeast Development Area	DM
2	Remove Damaged T-Hangar/Construct New T-Hangar (1 Building/20 Units)	SS/DM
3	Environmental Assessment and Installation of MALSR	EN/SS
4	Construct Taxiway Providing Access to Northeast Development Area	EF/DM
5	New Terminal Building Design and Construction	EF/DM
6	Airport Perimeter Landscaping	MN
7	Construct Corporate Itinerant Aircraft Parking Apron and Terminal Apron (19,370 sq. yds.)	DM
8	Construct Internal Support Vehicle Access Road	SS
9	Relocate ASOS	SS
10	Acquire Land for West Side Access Road Right-of-Way	OP
11	Construct West Side Parallel Taxiway to 75' Wide – Phase I	EF/DM
12	Relocate East Side Taxiway B	SS/EF
13	Construct Large Aircraft Overflow Apron on West Side Development Area (10,000 sq. yds.)	DM
14	Miscellaneous RAMP Projects	MN
	INTERMEDIATE TERM PROGRAM (6-10 YEARS)	
15	Reconstruct/Strengthen South Ramp Apron Area (24,500 sq. yds.)	MN
16	Environmental Assessment for Runway Extension	EN
17	Acquire 24.4 Acres of Land North of Runway (Safety Areas, Approach Protection, Buffer)	SS
18	Acquire 7.9 Acres of Avigation Easement for Runway Approach Protection	SS
19	Expand Auto Access Roads and Parking in Southeast Development Area	SS/DM
20	Construct Additional Apron/Taxilanes for T-Hangar Development in Southeast Area	DM
21	Construct T-Hangars in Southeast Development Area (4 Buildings/80 Units)	DM
22	Remove T-Hangars (4 Buildings/76 Units)	OP
23	Improve Apron for Hangar Development and Aircraft Parking; Expand Auto Access Road	MN/DM
24	Construct High-Speed Taxiway Exits; Remove Taxiways C and E	EF/DM
25	Construct Additional Apron for Hangar Development and Aircraft Access (10,700 sq. yds.)	DM
26	Construct Additional Apron for Aircraft Parking (15,330 sq. yds.)	DM
27	Earthwork/Site Preparation for Runway and Parallel Taxiway Extension to North	SS/DM
28	Relocate Localizer	SS
29	Extend Runway and Parallel Taxiways 700' North	DM
30	Update Airport Master Plan	DM/OP
31	Miscellaneous RAMP Projects	MN
	LONG TERM PROGRAM (11-20 YEARS)	
32	Construct Remainder of West Side Parallel Taxiway – Phase II	EF/DM
33	Construct Additional Apron/Taxilanes for T-Hangar Development in Southeast Area	DM
34	Construct T-Hangars in Southeast Development Area (3 Buildings/60 Units)	DM
35	Construct West Side Access Road from Center Street Extension, Terminal Roads, and Parking	DM
36	Expand Utilities for West Side Development Area - Phase I	DM
37	Construct West Side Terminal Area - Phase I (Apron and Taxilanes)	DM
38	Widen Taxiways A and F to 50' to Accommodate ADG III Aircraft	SS/DM
39	Reconstruct/Strengthen Runway 16-34 to 120,000 Pounds DWL (6,080' x 100')	MN
40	Reconstruct/Strengthen East Side Taxiways to 120,000 Pounds DWL	MN
41	Expand Utilities for West Side Development Area - Phase II	DM
42	Construct Additional Terminal Roads and Parking	DM
43	Expand West Side Terminal Area - Phase II (Apron and Taxilanes)	DM
44	Construct Additional Apron/Taxilanes for T-Hangar Development and Aircraft Parking on West Side	DM
45	Construct T-Hangars on West Side (2 Buildings/40 Units)	DM
46	Miscellaneous RAMP Projects	MN

Categories: SS – Safety/Security
EN – Environmental
MN – Maintenance
EF – Efficiency
DM – Demand
OP - Opportunities

SHORT TERM IMPROVEMENTS

The short term planning horizon CIP considers 13 projects for the five-year period and is presented on **Exhibit 6A** and illustrated on **Exhibit 6B**. A large majority of these projects deal with expanding the east side of the airport and include taxiways, taxilanes, aircraft parking aprons, and T-hangar development. Toward the end of the short term planning period, projects are identified to begin developing the west side of the airport. These include a west side parallel taxiway and aircraft parking apron.

The first project listed in the plan calls for infrastructure and utility improvements in the southeast development area. As shown on the recommended plan, this area is to be dedicated to hangar development, mainly in the form of T-hangars. Extending utility services, roadway access, taxilanes, and apron pavement to this area will allow for the future development of these hangars. To follow this project, the City plans to remove a T-hangar complex that was damaged by fire and construct a new one in the southeast area.

An environmental assessment and installation of a medium intensity approach lighting system with runway alignment lights (MALSR) is also included in the short term CIP. This project, which is scheduled for next year if FAA funding is available, will follow up the implementation of a precision instrument landing system (ILS) approach to Runway 34 that included the installation of a localizer and glideslope antenna. The environmental assessment and future engineering and design will determine potential environmental impacts and exact placement of the MALSR. This project is being funded entirely by the Federal Aviation Administration (FAA).

The airport is currently in the process of leasing land north of the terminal area for private hangar development that could house corporate flight departments and aviation businesses. A taxiway is planned to be constructed in this area to provide aircraft access to the existing runway and taxiway system.

The next four projects in the short term are associated with the terminal area on the east side of the airport. As previously discussed, forecasts predict that additional terminal building space and aircraft parking space will be needed to accommodate the future demands of aircraft and passengers utilizing the airport. In an effort to provide both, the plan calls for the design and construction of a new terminal building to be located approximately 400 feet northeast of the existing facility. The location of the existing facility will provide additional aircraft parking space and conventional hangar development that can provide aviation-related services. A large aircraft parking apron addition is also planned in front of the new terminal building which would allow for additional itinerant corporate aircraft parking.

In addition to these aviation-related terminal facilities, a vehicle access road is planned north of the new terminal building that will provide access to the private hangar development north of the terminal area. This is desired as it will limit the amount of vehicular traffic transitioning active taxiways and other aircraft movement areas. Also included are improvements to the airport's perimeter landscaping to provide a more professional and aesthetic appeal and to meet City regulations.

The last projects to be considered in the short term planning period are associated with the potential expansion of the west side of the airport. A west side parallel taxiway is planned that will begin to allow for development on the west side of the airport. In addition to the parallel taxiway, a 10,000 square-foot apron will be constructed to provide for overflow aircraft parking. Since there will be no automobile access to the west side of the airport at this time, it is assumed that aircraft would drop off/pick up passengers and/or cargo on the east side of the airport and be towed or taxied to the west side for parking only.

Due to the current location of the glideslope antenna and the proposed location of the west side parallel taxiway, the plan recommends constructing the taxiway in two separate phases. Phase I will include construction of approximately 5,000 feet of taxiway, stopping short of the glideslope critical area to the south. Previous analysis pointed to the fact that approximately 70 percent of aircraft operations at Arlington Municipal Airport utilize a southerly approach/departure. With the parallel taxiway extending to the end of Runway 16, this will allow a large percentage of aircraft operations originating on the west side of the airport the ability to enter Runway 16 without having to back-taxi on the runway. For those operations originating on the west side of the airport that will require a northerly departure, they can taxi east across Runway 16-34 utilizing the relocated Taxiway B, which will limit the amount of time taxiing aircraft will be on the runway, thereby creating a safer and more efficient airfield environment. Further development of the west side parallel taxiway will be addressed in the long term planning horizon.

The parallel taxiway could also serve as a "temporary" runway in the event that Runway 16-34 is closed due to maintenance or an emergency. In order to ensure the airport remains open and can support a large percentage of forecast operations, it is recommended that this parallel taxiway be constructed to 75 feet in width to better accommodate aircraft when used as a "temporary" runway. The parallel taxiway can also be used for itinerant aircraft parking in the event that all other aircraft parking aprons are fully utilized. The National Football League (NFL) has designated the Dallas Cowboys' football stadium currently being built in Arlington to host the 2011 Super Bowl. An event such as this will bring several hundred corporate aircraft to the area. Having this parallel taxiway to provide temporary parking for anticipated traffic associated with an event such as the Super Bowl would be very beneficial, while still allowing normal flow of aircraft operations.

The current location of the Automated Surface Observation System (ASOS) and the proposed location of the west side parallel taxiway will warrant the relocation of the ASOS. Several locations on the airfield could accommodate the ASOS, including the area adjacent to the glideslope antenna or an area of vacant land between Bell Helicopter's private facility and proposed T-hangar development in the west side terminal area. If it were to be located adjacent to the glideslope antenna, this location will already provide utilities similar to what the ASOS requires and relocation costs could be minimized. Further study outside the master plan will be needed to determine an ideal location.

Also included in the short term planning period is land acquisition for the future development of the west side access road connecting to the Center Street extension. This acquisition will provide the desired right-of-way for road construction and utility easements.

Ongoing maintenance of airport surfaces is considered throughout the plan. The plan includes utilizing Routine Airport Maintenance Program (RAMP) funds available from the Texas Department of Transportation (TxDOT) – Aviation Division. Each year, TxDOT offers RAMP funds provided the airport sponsor matches the amount. Starting this year, RAMP funds were increased to $50,000 per airport. Airport sponsors are required to match the RAMP grant; thus, airports are able to spend $100,000 per year on several types of airport-related projects. The CIP considers a total of 500,000 in RAMP funds for the five-year planning horizon. Some of the projects listed in the short term CIP are RAMP eligible; therefore, part of the funding is assumed to be provided by RAMP funds. As a result, this funding amount was subtracted from the $500,000 total to show what is left for RAMP eligibility.

Short term projects presented on Exhibit 6A and graphically depicted on Exhibit 6B have been estimated to cost approximately $19.6 million. Of that total, the local share is projected to be $6.4 million.

INTERMEDIATE TERM IMPROVEMENTS

The intermediate term CIP considers 17 projects for the five-year timeframe that include the continued expansion of the southeast development area as well as a runway and parallel taxiway extension. Intermediate improvements are listed on **Exhibit 6A** and depicted on **Exhibit 6B**.

The initial project in the intermediate term deals with the strengthening and reconstruction of the south ramp apron area. Currently, this area is utilized for small aircraft tiedowns and parking. In order to accommodate larger aircraft, this pavement will need to be reconstructed with concrete to provide the proper weight bearing capacities needed for corporate jets.

Next, projects are identified that prepare for a potential runway extension. The construction of the runway extension is planned toward the end of the intermediate term planning period; however, several projects must be implemented leading up to the actual extension. Prior to any significant construction on the airport, an environmental assessment (EA) is required. If there are no significant environmental impacts identified, then the process can proceed to design and engineer the runway extension.

The runway extension will also require supplementary projects. As proposed, the runway would be extended 700 feet north. The northerly extension of the runway would remain entirely on airport property; however, additional property would need to be acquired to secure areas within the runway protection zone (RPZ), runway safety area (RSA), and object free area (OFA). At this time, the plan considers the fee simple acquisition of approximately 24.4 acres of land north of the airport extending to the Interstate 20 outer road to meet FAA and TxDOT safety standards. The RPZ extends farther north across Interstate 20. It is recommended that this area be controlled through an avigation easement. In addition, two small parcels to the south of the airport that will be included in the future RPZ associated with the ILS approach should also be controlled by avigation easements.

The intermediate term CIP includes continued hangar development in the southeast area of the airport. Prior to building hangars, additional roadways, parking lots, taxilanes, and aprons will need to be constructed to accommodate T-hangar and conventional hangar development. Only after several T-hangar complexes are constructed in the southeast development area will the proposed removal of the current City-owned T-hangars be able to take place. In doing so, space for additional aircraft parking and conventional hangar development will be provided that could support fixed base operation (FBO) activities.

Other projects in the intermediate term include the construction of four high-speed taxiway exits on Runway 16-34 to increase the airport's annual service volume and provide for more efficient movement of aircraft operations. The construction of the high speed taxiway exits on the east side of the runway will call for the removal of existing Taxiways C and E. Consideration should also be given to developing additional apron space on the east side of the airport for aircraft parking and hangar development.

Remaining projects in the intermediate term deal specifically with the runway and parallel taxiway extension. Extensive site preparation and the relocation of the localizer will have to occur before the runway and parallel taxiways are extended to the north. Various RAMP projects and an update of the airport's master plan are also included.

Projects included in the intermediate term have been estimated to cost $27.2 million, as presented on Exhibit 6A and graphically depicted on Exhibit 6B. The total local share is approximately $6 million.

LONG TERM IMPROVEMENTS

The long term CIP considers 15 projects for the ten-year period mainly focused on the expansion of the west side of the airport and improving runway and taxiway pavements. These improvements are listed on **Exhibit 6A** and illustrated on **Exhibit 6B**.

The first project in the long term includes the Phase II development of the west side parallel taxiway. This construction will take place only if the glideslope antenna associated with the ILS precision approach is replaced completely with global positioning system (GPS) precision approach capabilities to the airport, at which time the FAA would decommission the ILS approach and remove the glideslope antenna. This would allow for the expansion of the west side parallel taxiway to the south to connect to the end of Runway 34.

Continued hangar development in the southeast area of the airport is next on the list. Projects include apron expansion and T-hangar and taxilane construction. With the completion of these projects, the east side of the airport will be near build-out. As previously discussed, demand will dictate the rate and degree to which hangars and other aviation-related facilities will be developed on the east side of the airport, in particular the southeast area.

Several projects within the long term CIP deal with the development of the west side of the airport. Currently, Bell Helicopter's private facility and the airport traffic control tower (ATCT) are located west of Runway 16-34. Future development of this area will require additional utility and infrastructure improvements, as well as automobile access. As depicted on **Exhibit 6B**, the City of Arlington has an approved design for the extension of Center Street to extend along the west side of the airport. This will allow for a road to be constructed that can provide access to the west side of the airport. The plan also calls for the construction of approximately 26,700 square yards of aircraft apron space and taxilanes to support conventional hangar development that would house aviation activities such as FBO operations, corporate flight departments, and other aviation businesses.

At this point in the planning horizon, Runway 16-34 and the east side taxiways will likely need to be reconstructed to accommodate larger aircraft that will represent the critical aircraft operating at the airport. Previous analysis indicated that the airport should accommodate aircraft up to and including Airport Reference Code (ARC) C/D-III. For aircraft in airplane design group (ADG) III, FAA design standards call for taxiways to be at least 50 feet wide. As a result, the parallel and connecting taxiways to the east of Runway 16-34 are planned to be widened to 50 feet.

The runway and taxiways are constructed of concrete, and full rehabilitation will require complete reconstruction of the pavement surfaces. If reconstruction is necessary, the airport could face an extended period of complete closure of Runway 16-34. This is not desirable as airport businesses will be crippled by lack of revenue. Moreover, several tenants would likely have to relocate to another local airport during reconstruction. Reconstruction of a concrete runway could take as long as one year to complete, with a minimum of six months if all factors are favorable. As previously discussed, it is for this reason that the west side parallel taxiway, planned for construction earlier on, should be 75 feet wide in order to serve as a "temporary" runway in the event of a major reconstruction of Runway 16-34. The reconstruction of the runway and east side taxiways will also provide for increased pavement strengths to accommodate ARC C/D-III aircraft.

The last projects to be considered in the long term horizon include continued expansion of the west side of the airport. Additional utilities, aircraft parking aprons, taxilanes, and hangar development are included that would provide the necessary infrastructure to meet the potential aviation demand. Various RAMP projects, estimated at $100,000 per year, are also included in the long term CIP, and some of these funds have been allocated to projects previously mentioned.

Total long term projects listed on Exhibit 6A and graphically depicted on Exhibit 6B have been estimated to cost approximately $36 million in today's (2007) dollars. The local share is estimated at $9.5 million. The total CIP program costs are estimated at $82.8 million, with $21.8 million being the projected local share.

IMPROVEMENTS SUMMARY

The CIP covers potential demand-based development at Arlington Municipal Airport over the next 20 years. Many of the planned facilities at the airport are not included in the CIP, as they are projected to be necessary beyond the scope of this plan. Those projects are related to the completion of the west side development areas.

Most airport improvements presented in the recommended concept are demand-based. These facilities should be constructed to serve an existing demand at the airport at that time. This plan does not support building facilities in order to attract activity. Because the plan is demand-based rather than time-based, it provides airport management and the City of Arlington with the flexibility to develop facilities as needed. Should demand increase at a greater rate than is forecast, implementation of these improvements can be advanced. Should demand slow, the life of the master plan is effectively increased.

CAPITAL IMPROVEMENTS FUNDING

Financing of capital improvements at Arlington Municipal Airport will not rely solely on the financial resources of the airport. Capital improvement funding is available through various grant-in-aid programs on both the federal and state levels. The following discussion outlines key sources of funding potentially available for capital improvements at Arlington Municipal Airport.

FEDERAL GRANTS

The United States Congress has long recognized the need to develop and maintain a system of aviation facilities across the nation for purposes of national defense and promotion of interstate commerce. Various grant-in-aid programs to public airports have been established over the years for this purpose. The most recent legislation is the Airport Improvement Program (AIP) of 1982. The AIP has been reauthorized several times, with the most recent legislation enacted in late 2003 and entitled the *Vision 100 – Century of Aviation Reauthorization Act.*

Vision 100's enacted four-year program covers FAA fiscal years 2004, 2005, 2006, and 2007. This bill presented similar funding levels to the previous reauthorization – *AIR 21*. Funding was authorized at $3.4 billion in 2004, $3.5 billion in 2005, $3.6 billion in 2006, and $3.7 billion in 2007. This has allowed the FAA and TxDOT the opportunity to plan for longer term projects versus single-year reauthorizations.

The source for AIP funds is the Aviation Trust Fund. The Aviation Trust Fund was established in 1970 to provide funding for aviation capital investment programs (aviation development, facilities and equipment, and research and development). The Trust Fund also finances much of the operation of the FAA. It is funded by user fees, taxes on airline tickets, aviation fuel, and various aircraft parts. The funds are distributed under appropriations set by Congress to airports in the United States which have certified eligibility. The distribution of grants is administered by the FAA.

Non-Primary Entitlement Funds

Funds are distributed each year by the FAA from appropriations by Congress. A portion of the annual distribution is to primary commercial service airports based upon enplanement (passenger) levels. If Congress appropriates the full amount authorized by *Vision 100*, eligible general aviation airports could receive up to $150,000 of funding each year in Non-Primary Entitlement (NPE) funds. Eligible general aviation airports include those that are included in the National Plan of Integrated Airport Systems (NPIAS). The NPIAS was recently updated this year and includes years 2007-2011. Arlington Municipal Airport is eligible for the full $150,000 in NPE funds for fiscal year 2007.

Discretionary Funds

In a number of cases, airports face major projects that will require funds in excess of the airport's annual non-primary entitlements. Thus, additional funds from discretionary apportionments under AIP are desirable. The primary feature about discretionary funds is that they are distributed on a priority basis. A National Priority Ranking System is used to evaluate and rank each airport project. Under this system, projects are ranked by their purpose. Projects ensuring airport safety and security are ranked as the most important priorities, followed by maintaining current infrastructure development, mitigating noise and other environmental impacts, meeting standards, and increasing system capacity.

Whereas non-primary entitlement monies are guaranteed on an annual basis, discretionary funds are not assured. If the combination of entitlement and discretionary funds does not provide enough capital for planned development, projects would either be delayed or require funding from the airport's revenues or other authorized sources.

It is important to note that competition for discretionary funding is not limited to airports in the State of Texas or those within the FAA Southwest Region. The funds are distributed to all airports in the country and, as such, are more difficult to obtain. High priority projects will often fair favorably, while lower priority projects many times will not receive discretionary grants. Further, with the State of Texas included in the State Block Grant Program, which will be discussed in more detail in the next section, the state's federal funding allotment must be distributed to many airports each year. As a result, TxDOT will typically limit the size of grants given to a single airport sponsor to ensure adequate funding for the state airport system as a whole. Thus, projects that require a large amount of funding may require the City to attract discretionary funding assistance.

STATE FUNDING PROGRAM

The State of Texas participates in the federal State Block Grant Program. Under this program, the FAA annually distributes general aviation state apportionment and discretionary funds to TxDOT. The state then distributes grants to airports within the state. In compliance with TxDOT's legislative mandate that it "apply for, receive, and disburse" federal funds for general aviation airports, TxDOT acts as the agent of the local airport sponsor. Although these grants are distributed by TxDOT, they contain all federal obligations.

The State of Texas also distributes funding to general aviation airports from the Highway Trust Fund as the Texas Aviation Facilities Development Program. These funds are appropriated each year by the state legislature. Once distributed, these grants contain state obligations only.

The establishment of a CIP for the state entails first identifying the need, then establishing a ranking or priority system. Identifying all state airport project needs allows TxDOT to establish a biennial program and budget for development costs. The most recent TxDOT CIP, *Aviation Capital Improvement Program 2008-2010*, which was in draft form at the time of this writing, assumed that approximately $22 million in annual federal AIP grants, plus $20 million earmarked for non-primary entitlements and $15 million in state funds, would be available.

The TxDOT biennial program establishes a project priority system based upon the following objectives (in order of importance):

- enhance safety
- preserve existing facilities
- bring airport up to standards
- upgrade facilities to aid airport in providing for larger aircraft with longer stage lengths
- improve airport capacity
- new airport construction to provide new access to a previously unserved area
- new airports to provide capacity relief to existing airports.

Each airport project for Arlington Municipal Airport must be identified and programmed into the state CIP and compete with other airport projects in the state for federal and state funds. In Texas, airport development projects that meet TxDOT's discretionary funds eligibility requirements receive 90 percent funding from the AIP State Block Grant Program. Eligible projects include airfield and apron facilities. Historically, revenue-generating improvements such as fuel facilities, utilities, and hangars have not been eligible for AIP funding. *Vision 100*, however, provides for the allowance of NPE funds to be utilized for hangar or fuel farm construction if all other airfield needs have been addressed.

TxDOT has also established the Routine Airport Maintenance Program (RAMP) to help general aviation airports maintain and, in some instances, construct new facilities. The program was initially designed to help airports maintain airside and landside pavements, but has recently been expanded to include construction of new facilities. RAMP is an annual funding source in which TxDOT will provide a 50 percent funding match for projects up to $100,000. Examples of projects eligible under RAMP include pavement crack sealing, drainage improvements and maintenance, landscaping, public auto parking areas and access roads, expansion of apron areas or new apron areas, and many more.

Newer programs in the TxDOT funding mechanism include terminal building and ATCT funding. TxDOT has funded terminal building construction on a 50/50 basis, up to a $600,000 total project cost. It should be noted that TxDOT has recently considered upgrading the total cost allowance on a case-by-case basis. Arlington Municipal Airport is planning on utilizing this program for the construction of a new terminal building in the short term planning period.

TxDOT also funds the construction of up to two ATCTs statewide each year. TxDOT has improved the program so that ATCT funding could be provided on a 90/10 basis, up to a total construction cost of $1.67 million. The airport recently constructed an ATCT in 2006 with financial assistance from TxDOT.

FAA FACILITIES AND EQUIPMENT (F&E) PROGRAM

The Airway Facilities Division of the FAA administers the Facilities and Equipment (F&E) Program. This program provides funding for the installation and maintenance of various navigational aids and equipment of the national airspace system. Under the F&E program, funding is provided for FAA ATCTs, enroute navigational aids, on-airport navigational aids, and approach lighting systems.

It is anticipated that the environmental assessment and installation of the MALSR will be funded by this program, as indicated on **Exhibit 6A**. As activity levels and other developments warrant, the airport may be considered by the FAA Airways Facilities Division for the installation and maintenance of navigational aids through the F&E program.

LOCAL SHARE FUNDING

The balance of project costs, after consideration has been given to the various grants available, must be funded through airport resources. Usually, this is accomplished through the use of airport earnings and reserves, to the extent possible, with the remaining costs financed through loans and revenue bonding.

The Arlington Municipal Airport is a general fund within the City. It operates on a self-sustaining basis from the collection of various rates and charges spread between hangar leases, land leases, fuel flowage fees, and other revenues. There are restrictions on the use of revenues collected by the airport. All receipts, excluding bond proceeds or related grants and interest, are irrevocably pledged to the punctual payment of operating and maintenance expenses, payment of debt service for as long as revenue bonds remain outstanding, or to additions or improvements to airport facilities.

FINANCING OF DEVELOPMENT PROGRAM

Earlier in this chapter, programmed capital expenditures were presented in current (2007) dollars. Future expenditures were categorized according to assigned financing responsibilities, with the airport=s responsible expenditures the primary focus of these feasibility analyses. In this section, the base costs assumed to be the financing responsibility of the airport, such as T-hangar construction, are adjusted to reflect available funding to determine the projected local share of these proposed capital expenditures in current dollars. Financing assumptions are then made, and the projected annual airport cost of these planned expenditures is estimated for incorporation into the cash flow analysis.

At the outset, it must be emphasized that long term feasibility analyses such as these must be based on many assumptions. In practice, projects will be undertaken when demand actually warrants, thus changing underlying assumptions. Further, the actual financing of capital expenditures will be a function of airport circumstances at the time of project implementation (i.e., revenue bond financing would likely not be used unless the actual level of airport earnings and reserves, along with entitlement and discretionary grants available at a particular time, were insufficient to meet project costs). As a result, the assumptions and analyses prepared for the master plan must be viewed in the context of their primary purpose: to examine whether there is a reasonable expectation that recommended improvements will be financially feasible and implementable.

The balance of project costs, after consideration has been given to grants, must be funded through local resources. According to **Exhibit 6A**, local funding will be needed in each planning horizon. This includes $6,204,565 in the short term, $5,980,199 million in the intermediate term, and $9,485,623 million in the long range. The capital improvement program has assumed that some landside facility development (i.e., conventional hangars and public auto parking) would be completed privately.

There are several alternatives for local finance options for future development at the airport, including airport revenues, direct funding from the City, issuing bonds, and leasehold financing. These strategies could be used to fund the local matching share or complete the project if grant funding cannot be arranged.

The airport is owned by the City of Arlington and conducts its daily operations through the collection of various rates and charges from general aviation revenue sources. These revenues are generated specifically by airport operations. There are, however, restrictions on the use of revenues collected by the airport. All receipts, excluding bond proceeds or related grants and interest, are irrevocably pledged to the punctual payment of operating and maintenance expenses, payment of debt service for as long as bonds remain outstanding, or to additions or improvements to airport facilities. **Table 6C** presents historical operating expenses and revenues for Arlington Municipal Airport over the past five years.

TABLE 6C
Historical Operational Revenues and Expenses
Arlington Municipal Airport

CATEGORY	FY02	FY03	FY04	FY05	FY06
OPERATIONAL REVENUES					
Terminal Building Leases	$25,813.67	$25,268.47	$34,752.05	$27,643.36	$25,388.12
Hangar Rents	224,304.44	224,605.41	234,469.85	241,603.66	196,084.72
Tie-down Charges	24,289.50	22,008.30	25,447.12	25,433.00	27,286.55
Land & Ramp Leases	187,843.41	184,218.14	191,890.88	199,566.44	178,968.76
Fuel Flowage Fees	0.00	908.00	1,970.00	1,740.00	1,090.00
TOTAL REVENUES	$462,251.02	$457,008.32	$488,529.90	$495,986.46	$428,818.15
OPERATIONAL EXPENSES					
Salary, Wages, & Benefits	$446,141.06	$443,414.09	$474,859.19	$507,484.71	$494,898.64
Supplies & Materials	830.68	1,989.89	1,963.01	3,431.09	2,371.03
Miscellaneous	2,160.42	1,197.61	4,592.07	44,783.90	30,830.79
Utilities	45,671.17	44,291.54	36,909.79	43,320.51	64,532.18
Maintenance	10,757.70	8,195.21	13,108.55	14,396.96	17,483.86
Advertising	852.87	0.00	0.00	886.50	0.00
Travel & Training	2,604.58	2,786.44	2,623.81	2,911.42	7,154.71
Interdepartmental Charges	33,472.93	39,820.19	28,956.19	37,287.04	37,683.77
TOTAL EXPENSES	$542,491.41	$541,694.97	$563,012.61	$654,502.13	$654,954.98
NET OPERATIONAL INCOME/(LOSS)	($80,240.39)	($84,686.65)	($74,482.71)	($158,515.67)	($226,136.83)

OPERATING REVENUES

Operating revenues at Arlington Municipal Airport include hangar rentals, ground leases, terminal building leases, tie-down fees, ramp leases, fuel flowage fees, and other income. As shown in **Table 6C**, while operating revenues have been sizeable, they have trailed operating expenses over the period. Operating revenues do not include grants received or transfers in from other City sources.

The largest revenue center for the airport is the rental of hangars, followed closely by land and ramp leases. The airport rents one conventional hangar and five T-hangars. It should be noted that one T-hangar facility was lost to fire in late 2005 and the drop in this category's revenue for fiscal year 2006 reflects the loss of rental space. Hangar rentals account for approximately 46 percent of overall revenues.

The second largest revenue source is generated from land and ramp leases. This revenue source currently accounts for 42 percent of annual airport income. This category includes land leases for the airport businesses such as Harrison Aviation, Bell Helicopter – Textron, and others, as well as ground leases for fuel storage facilities, private hangar developments, and ramp leases. Moreover, this category includes the fuel charge to Harrison Aviation. Airports can either charge a fuel flowage fee or a lump sum charge within FAA's compliance order. Fuel flowage fees are more common and typically apply a per gallon delivered rate to the fuel provider. The lump sum charge is less common but provides a regular, fixed revenue, allowing the airport to budget accordingly as it is not affected by large shifts in fuel sales. It should be noted that the fuel flowage fee item in **Table 6C** reflects a $0.10 per gallon delivered to a private operator. This operator utilizes a private fuel truck to dispense fuel for its own operation.

The hangar and land lease rates have been established in a manner to allow for market adjustments. Generally, these leases include a three year adjustment period with a 20 percent cap on increases. Land for unimproved areas on the airport is currently leased at a rate of $0.20 per square-foot, per year. Improved land leases range upwards to a rate of $0.32 per square-foot, per year.

Other revenue streams include terminal building office leases and aircraft apron tie-down charges. The airport currently maintains five terminal building office leases with a rate of $11.50 per square-foot. Tie-down leases are charged to aircraft based on the ramp or for itinerant aircraft storage on the ramp.

OPERATING EXPENSES

Generalized operating expenses for Arlington Municipal Airport include personnel services, utilities, maintenance, and miscellaneous expenses. Personnel services are the largest expense category, accounting for approximately 76 percent of total operating expenses. Personnel services relate to compensation, including benefits, for airport staff. Usually this expense will show a predictable increase over the years. Materials and utility expenses is another expense that will typically show moderate increases.

As is evident from **Table 6C**, the airport has operated at a deficit over the past five years. Most general aviation airports are not financially self-sufficient and require revenue support from their sponsor.

The following section will analyze future revenues and expenses. It is the goal of this subsection to provide airport management with the information needed to maintain a self-sufficient financial position while continuing to invest in airport projects.

FUTURE CASH FLOW

Operating Revenues

Revenues are anticipated to continue to grow with aviation activity and an overall positive economic outlook. As more aircraft base at the airport, additional revenues from hangar rentals, land leases, and fuel sales will increase proportionately.

One notable change will be revenues derived by natural gas drilling of airport property. The City of Arlington has recently entered into a contract with a natural gas drilling operation, and this agreement will provide significant revenues for the airport. The gas will be extracted from airport property via pipelines from off-site drilling units.

The natural gas revenue structure will provide three types of revenues. First, the City of Arlington will receive a bonus payment by the provider. This one time bonus will exceed $6.5 million. Next, a 20-year lease for the pipeline will be paid upfront. The lease calls for a $43.50 per linear-foot of pipe, providing $370,000 for the 20 year lease. Finally, the airport will receive 27 percent of the gross proceeds, referred to as royalties, from the sale of gas extracted from airport property. Projecting the annual royalties is somewhat difficult as the drilling has yet to begin. Conservative estimates indicate that the airport can expect approximately $250,000 per year from gas royalties. Annual royalties will vary widely as they will depend on the market price of natural gas and natural gas supply on-airport. For the sake of this analysis, the conservative estimate will be utilized.

It should be noted that the City intends to bank 90 percent of all bonus and lease revenues in a "Tomorrow Fund." The Tomorrow Fund will be placed in an interest-bearing account and will be dedicated to future airport capital and operating expenses to be used as needed. The primary goal is to allow the fund to generate interest above any bonding mechanisms for capital expenditures. As such, capital projects can be bonded and the debt service managed by funds from the Tomorrow Fund. At this time, royalty revenues are also planned to be placed in the Tomorrow Fund as well; however, for the sake of this analysis, they are categorized as an annual operational revenue as presented in **Table 6D**.

Rates and fees should be increased based upon the consumer price index or other similar economic index. Where airport fees are considered too low, additional increases should be undertaken to bring the fees up to current market standards. The current rates and fees are considered in line with market standards; as such, no immediate corrective action on the rates and fees is recommended. As previously mentioned, the airport has in place lease adjustment terms. These adjustments allow the airport to increase the lease rates every three years up to 20 percent based on market conditions. These adjustments should continually be a part of airport lease structures.

TABLE 6D
Projected Annual Average Revenues and Expenses
Arlington Municipal Airport

CATEGORY	Short Term	Intermediate Term	Long Term
OPERATING REVENUES			
Terminal Building Leases	$36,780	$55,260	$64,190
Hangar Rents	273,980	399,440	770,240
Tie-down Charges	35,370	46,460	64,690
Land & Ramp Leases	198,170	230,840	269,230
Natural Gas Royalties	250,000	250,000	250,000
Total Revenues	*$794,300*	*$982,000*	*$1,418,350*
OPERATING EXPENSES			
Salary, Wages, & Benefits	$568,580	$675,290	$877,300
Supplies & Materials	2,780	3,380	4,560
Miscellaneous	5,310	5,860	6,810
Utilities	75,610	91,990	124,040
Maintenance	19,700	22,830	28,580
Advertising	930	1,180	1,720
Travel & Training	8,380	10,200	13,750
Interdepartmental Charges	39,220	41,220	44,430
Total Expenses	*$720,510*	*$ 851,950*	*$1,101,190*
OPERATING INCOME/(LOSS)	***$73,790***	***$130,050***	***$317,160***

Land lease rates at Arlington Municipal Airport are between 19 and 32 cents per square-foot per year. Factors such as the availability of utilities and the proximity to taxiways account for the range of rates. These rates are considered to be within the going rates in the region. For cash flow analysis, an average of 25 cents per square-foot was utilized for future development. Terminal building leases are $11.50 per square-foot per year, and this rate has also been extended in the future.

Previous projections show a potential increase in based aircraft. In order to accommodate this growth, a number of T-hangar facilities are considered to be constructed. Rental fees from these hangars will be collected as revenue. Private hangar development is also planned, and as such, increases in land and ramp fees have been projected based on the development plan.

Cash flow projections indicate future revenues should rise at a greater rate than expenses. Analysis presented in **Table 6D** indicates that the airport should be capable of generating sufficient operating revenues to cover annual expenditures. Revenue and expense projections have been made as an average of each planning horizon.

Operating Expenses

Future expenses, as presented in **Table 6D**, could vary depending upon the airport=s desire to develop, operate, and maintain additional hangars. Airport management has indicated that future T-hangar construction will likely be accomplished by a combination of City and private sector development. Construction of executive and conventional hangars will be done through private developers.

Personnel expenses include salaries and benefits. This category is assumed to increase by approximately four percent per year as are utility and other expense categories. The miscellaneous expense center was reduced to pre-2005 figures as the FY 2005 and 2006 years included one-time expenses which would not likely occur in the future.

BONDING AND FINANCING SOURCES

There are several municipal bonding options available to the City of Arlington, including general obligation bonds, limited obligation bonds, and revenue bonds. General obligation bonds are a common form of municipal bond which is issued by voter approval and is secured by the full faith and credit of the City. City tax revenues are pledged to retire the debt. As instruments of credit, and because the community secures the bonds, general obligation bonds reduce the available debt level of the community. Due to the community pledge to secure and pay general obligation bonds, they are the most secure type of municipal bond and are generally issued at lower interest rates and carry lower costs of issuance. The primary disadvantage of general obligation bonds is that they require voter approval and are subject to statutory debt limits. This requires that they be used for projects that have broad support among the voters, and that they are reserved for projects that have the highest public priorities.

In contrast to general obligation bonds, limited obligation bonds (sometimes referred to as Self-Liquidating Bonds) are secured by revenues from a local source. While neither general fund revenues nor the taxing power of the local community is pledged to pay the debt service, these sources may be required to retire the debt if pledged revenues are insufficient to make interest and principal payments on the bonds. These bonds still carry the full faith and credit pledge of the local community and, therefore, are considered for the purpose of financial analysis as part of the debt burden of the local community. The overall debt burden of the local community is a factor in determining interest rates on municipal bonds.

There are several types of revenue bonds, but in general, they are a form of municipal bond which is payable solely from the revenue derived from the operation of a facility that was constructed or acquired with the proceeds of the bonds. For example, a Lease Revenue Bond is secured with the income from a lease assigned to the repayment of the bonds. Revenue bonds have become a common form of financing airport improvements. Revenue bonds present the opportunity to provide those improvements without direct burden to the taxpayer. Revenue bonds normally carry a higher interest rate because they lack the guarantees of general and limited obligation bonds.

Leasehold financing refers to a developer or tenant financing improvements under a long term ground lease. The obvious advantage of such an arrangement is that it relieves the community of all responsibility for raising the capital funds for improvements. However, the private development of facilities on a ground lease, particularly on property owned by a municipal agency, produces a unique set of problems. In particular, it is more difficult to obtain private financing as only the improvements and the right to continue the lease can be claimed in the event of a default. Ground leases normally provide for the reversion of improvements to the lessor at the end of the lease term, which reduces their potential value to a lender taking possession. Also, companies that want to own their property as a matter of financial policy may not locate where land is only available for lease.

AIRPORT ECONOMIC IMPACT

The airport is operated as a business. Its operation generates revenues, which are secured by Federal Grant Assurances to be utilized only on the airport. While the revenues generated are significant, they are often times not enough to fund both airport operating expenditures and capital improvement requirements. Most general aviation airports in this country do not generate enough revenues to cover operating expenses. Nearly all need some level of community tax or bonding support to fund capital expenditures.

TxDOT has recently updated the Economic Impact of Airports in the State of Texas. The study provides an economic impact analysis of every general aviation airport in the state, thus quantifying aviation's total economic impact statewide. This information is valuable as many non-aviation residents do not fully understand aviation impacts and believe airports to be for the wealthy.

The study indicated that general aviation in the state of Texas supports 62,000 jobs with payroll benefits of more than $2.5 billion. In total, more than $8.7 billion in economic activity can be attributed to general aviation activity in the State. Those figures are remarkable when considering that the commercial airports provide even more economic impacts.

The study also indicates that general aviation airports provide services which are difficult to associate with an economic figure. Services such as business development, agricultural enhancements, medical transportation and evacuation, access to remote areas, law enforcement, fire protection, wildlife management, and recreation are all primary functions provided by general aviation airports. These services are vital, yet are difficult to quantify in terms of dollars.

The study presented significant economic impacts for Arlington Municipal Airport. Direct output from on-airport spending is estimated at $44 million supported by airport business and 39,870 general aviation visitors to the community each year. This economic activity supports $3.1 million in payroll and a total of $4.9 million in direct output into the local economy annually as well. Secondary, or indirect, impacts double these figures. The study indicated an additional $44.4 million in indirect economic output due to the operation of the airport. In total, the airport is estimated to provide $93.3 million in total economic impact while supporting 786 local jobs with $30.1 million in payroll. These impacts are very significant and would likely rank in the top tier of all Texas general aviation airports.

PLAN IMPLEMENTATION

The best means to begin implementation of the recommendations in this master plan is to first recognize that planning is a continuous process that does not end with completion and approval of this document. Rather, the ability to continuously monitor the existing and forecast status of airport activity must be provided and maintained. The issues upon which this master plan is based will remain valid for a number of years. The primary goal is for the airport to best serve the air transportation needs of the region, while continuing to be economically self-sufficient.

The actual need for facilities is most appropriately established by airport activity levels rather than a specified date. For example, projections have been made as to when additional hangars may be needed at the airport. In reality, however, the timeframe in which the development is needed may be substantially different. Actual demand may be slower to develop than expected. On the other hand, high levels of demand may establish the need to accelerate the development. Although every effort has been made in this master planning process to conservatively estimate when facility development may be needed, aviation demand will dictate when facility improvements need to be delayed or accelerated.

The real value of a usable master plan is in keeping the issues and objectives in the minds of the managers and decision-makers so that they are better able to recognize change and its effect. In addition to adjustments in aviation demand, decisions made as to when to undertake the improvements recommended in this master plan will impact the period that the plan remains valid. The format used in this plan is intended to reduce the need for formal and costly updates by simply adjusting the timing. Updating can be done by the manager, thereby improving the plan's effectiveness.

In summary, the planning process requires that airport management consistently monitor the progress of the airport in terms of aircraft operations and based aircraft. Analysis of aircraft demand is critical to the timing and need for new airport facilities. The information obtained from continually monitoring airport activity will provide the data necessary to determine if the development schedule should be accelerated or decelerated.

Arlington Municipal Airport

Appendix A

GLOSSARY OF TERMS

Glossary of Terms

ABOVE GROUND LEVEL: The elevation of a point or surface above the ground.

ACCELERATE-STOP DISTANCE AVAILABLE (ASDA): See declared distances.

ADVISORY CIRCULAR: External publications issued by the FAA consisting of non-regulatory material providing for the recommendations relative to a policy, guidance and information relative to a specific aviation subject.

AIR CARRIER: An operator which: (1) performs at least five round trips per week between two or more points and publishes flight schedules which specify the times, days of the week, and places between which such flights are performed; or (2) transports mail by air pursuant to a current contract with the U.S. Postal Service. Certified in accordance with Federal Aviation Regulation (FAR) Parts 121 and 127.

AIRCRAFT: A transportation vehicle that is used or intended for use for flight.

AIRCRAFT APPROACH CATEGORY: An alphabetic classification of aircraft based upon 1.3 times the stall speed in a landing configuration at their maximum certified landing weight.

AIRCRAFT OPERATION: The landing, takeoff, or touch-and-go procedure by an aircraft on a runway at an airport.

AIRCRAFT OPERATIONS AREA: A restricted and secure area on the airport property designed to protect all aspects related to aircraft operations.

AIRCRAFT OWNERS AND PILOTS ASSOCIATION: A private organization serving the interests and needs of general aviation pilots and aircraft owners.

AIRCRAFT APPROACH CATEGORY: A grouping of aircraft based on 1.3 times the stall speed in their landing configuration at their maximum certificated landing weight. The categories are as follows:

- *Category A:* Speed less than 91 knots.
- *Category B:* Speed 91 knots or more, but less than 121 knots.
- *Category C:* Speed 121 knots or more, but less than 141 knots.
- *Category D:* Speed 141 knots or more, but less than 166 knots.
- *Category E:* Speed greater than 166 knots.

AIRCRAFT RESCUE AND FIRE FIGHTING: A facility located at an airport that provides emergency vehicles, extinguishing agents, and personnel responsible for minimizing the impacts of an aircraft accident or incident.

AIRFIELD: The portion of an airport which contains the facilities necessary for the operation of aircraft.

AIRLINE HUB: An airport at which an airline concentrates a significant portion of its activity and which often has a significant amount of connecting traffic.

AIRPLANE DESIGN GROUP (ADG): A grouping of aircraft based upon wingspan. The groups are as follows:

- *Group I:* Up to but not including 49 feet.
- *Group II:* 49 feet up to but not including 79 feet.
- *Group III:* 79 feet up to but not including 118 feet.
- *Group IV:* 118 feet up to but not including 171 feet.
- *Group V:* 171 feet up to but not including 214 feet.
- *Group VI:* 214 feet or greater.

AIRPORT AUTHORITY: A quasi-governmental public organization responsible for setting the policies governing the management and operation of an airport or system of airports under its jurisdiction.

AIRPORT BEACON: A navigational aid located at an airport which displays a rotating light beam to identify whether an airport is lighted.

AIRPORT CAPITAL IMPROVEMENT PLAN: The planning program used by the Federal Aviation Administration to identify, prioritize, and distribute funds for airport development and the needs of the National Airspace System to meet specified national goals and objectives.

AIRPORT ELEVATION: The highest point on the runway system at an airport expressed in feet above mean sea level (MSL).

AIRPORT LAYOUT DRAWING (ALD): The drawing of the airport showing the layout of existing and proposed airport facilities.

AIRPORT MASTER PLAN: The planner's concept of the long-term development of an airport.

AIRPORT MOVEMENT AREA SAFETY SYSTEM: A system that provides automated alerts and warnings of potential runway incursions or other hazardous aircraft movement events.

AIRPORT OBSTRUCTION CHART: A scaled drawing depicting the Federal Aviation Regulation (FAR) Part 77 surfaces, a representation of objects that penetrate these surfaces, runway, taxiway, and ramp areas, navigational aids, buildings, roads and other detail in the vicinity of an an airport.

AIRPORT REFERENCE CODE (ARC): A coding system used to relate airport design criteria to the operational (Aircraft Approach Category) to the physical characteristics (Airplane Design Group) of the airplanes intended to operate at the airport.

AIRPORT REFERENCE POINT (ARP): The latitude and longitude of the approximate center of the airport.

AIRPORT SPONSOR: The entity that is legally responsible for the management and operation of an airport, including the fulfillment of the requirements of laws and regulations related thereto.

AIRPORT SURFACE DETECTION EQUIPMENT: A radar system that provides air traffic controllers with a visual representation of the movement of aircraft and other vehicles on the ground on the airfield at an airport.

AIRPORT SURVEILLANCE RADAR: The primary radar located at an airport or in an air traffic control terminal area that receives a signal at an antenna and transmits the signal to air traffic control display equipment defining the location of aircraft in the air. The signal provides only the azimuth and range of aircraft from the location of the antenna.

AIRPORT TRAFFIC CONTROL TOWER (ATCT): A central operations facility in the terminal air traffic control system, consisting of a tower, including an associated instrument flight rule (IFR) room if radar equipped, using air/ground communications and/or radar, visual signaling and other devices to provide safe and expeditious movement of terminal air traffic.

AIR ROUTE TRAFFIC CONTROL CENTER: A facility which provides enroute air traffic control service to aircraft operating on an IFR flight plan within controlled airspace over a large, multi-state region.

AIRSIDE: The portion of an airport that contains the facilities necessary for the operation of aircraft.

AIRSPACE: The volume of space above the surface of the ground that is provided for the operation of aircraft.

AIR TAXI: An air carrier certificated in accordance with FAR Part 121 and FAR Part 135 and authorized to provide, on demand, public transportation of persons and property by aircraft. Generally operates small aircraft "for hire" for specific trips.

AIR TRAFFIC CONTROL: A service operated by an appropriate organization for the purpose of providing for the safe, orderly, and expeditious flow of air traffic.

AIR ROUTE TRAFFIC CONTROL CENTER (ARTCC): A facility established to provide air traffic control service to aircraft operating on an IFR flight plan within controlled airspace and principally during the enroute phase of flight.

AIR TRAFFIC HUB: A categorization of commercial service airports or group of commercial service airports in a metropolitan or urban area based upon the proportion of annual national enplanements existing at the airport or airports. The categories are large hub, medium hub, small hub, or non-hub. It forms the basis for the apportionment of entitlement funds.

AIR TRANSPORT ASSOCIATION OF AMERICA: An organization consisting of the principal U.S. airlines that represents the interests of the airline industry on major aviation issues before federal, state, and local government bodies. It promotes air transportation safety by coordinating industry and governmental safety programs and it serves as a focal point for industry efforts to standardize practices and enhance the efficiency of the air transportation system.

ALERT AREA: See special-use airspace.

ALTITUDE: The vertical distance measured in feet above mean sea level.

ANNUAL INSTRUMENT APPROACH (AIA): An approach to an airport with the intent to land by an aircraft in accordance with an IFR flight plan when visibility is less than three miles and/or when the ceiling is at or below the minimum initial approach altitude.

APPROACH LIGHTING SYSTEM (ALS): An airport lighting facility which provides visual guidance to landing aircraft by radiating light beams by which the pilot aligns the aircraft with the extended centerline of the runway on his final approach and landing.

APPROACH MINIMUMS: The altitude below which an aircraft may not descend while on an IFR approach unless the pilot has the runway in sight.

APPROACH SURFACE: An imaginary obstruction limiting surface defined in FAR Part 77 which is longitudinally centered on an extended runway centerline and extends outward and upward from the primary surface at each end of a runway at a designated slope and distance based upon the type of available or planned approach by aircraft to a runway.

APRON: A specified portion of the airfield used for passenger, cargo or freight loading and unloading, aircraft parking, and the refueling, maintenance and servicing of aircraft.

AREA NAVIGATION: The air navigation procedure that provides the capability to establish and maintain a flight path on an arbitrary course that remains within the coverage area of navigational sources being used.

AUTOMATED TERMINAL INFORMATION SERVICE (ATIS): The continuous broadcast of recorded non-control information at towered airports. Information typically includes wind speed, direction, and runway in use.

AUTOMATED SURFACE OBSERVATION SYSTEM (ASOS): A reporting system that provides frequent airport ground surface weather observation data through digitized voice broadcasts and printed reports.

AUTOMATED WEATHER OBSERVATION STATION (AWOS): Equipment used to automatically record weather conditions (i.e. cloud height, visibility, wind speed and direction, temperature, dewpoint, etc.)

AUTOMATIC DIRECTION FINDER (ADF): An aircraft radio navigation system which senses and indicates the direction to a non-directional radio beacon (NDB) ground transmitter.

AVIGATION EASEMENT: A contractual right or a property interest in land over which a right of unobstructed flight in the airspace is established.

AZIMUTH: Horizontal direction expressed as the angular distance between true north and the direction of a fixed point (as the observer's heading).

BASE LEG: A flight path at right angles to the landing runway off its approach end. The base leg normally extends from the downwind leg to the intersection of the extended runway centerline. See "traffic pattern."

BASED AIRCRAFT: The general aviation aircraft that use a specific airport as a home base.

BEARING: The horizontal direction to or from any point, usually measured clockwise from true north or magnetic north.

BLAST FENCE: A barrier used to divert or dissipate jet blast or propeller wash.

BLAST PAD: A prepared surface adjacent to the end of a runway for the purpose of eliminating the erosion of the ground surface by the wind forces produced by airplanes at the initiation of takeoff operations.

BUILDING RESTRICTION LINE (BRL): A line which identifies suitable building area locations on the airport.

CAPITAL IMPROVEMENT PLAN: The planning program used by the Federal Aviation Administration to identify, prioritize, and distribute Airport Improvement Program funds for airport development and the needs of the National Airspace System to meet specified national goals and objectives.

CARGO SERVICE AIRPORT: An airport served by aircraft providing air transportation of property only, including mail, with an annual aggregate landed weight of at least 100,000,000 pounds.

CATEGORY I: An Instrument Landing System (ILS) that provides acceptable guidance information to an aircraft from the coverage limits of the ILS to the point at which the localizer course line intersects the glide path at a decision height of 100 feet above the horizontal plane containing the runway threshold.

CATEGORY II: An ILS that provides acceptable guidance information to an aircraft from the coverage limits of the ILS to the point at which the localizer course line intersects the glide path at a decision height of 50 feet above the horizontal plane containing the runway threshold.

CATEGORY III: An ILS that provides acceptable guidance information to a pilot from the coverage limits of the ILS with no decision height specified above the horizontal plane containing the runway threshold.

CEILING: The height above the ground surface to the location of the lowest layer of clouds which is reported as either broken or overcast.

CIRCLING APPROACH: A maneuver initiated by the pilot to align the aircraft with the runway for landing when flying a predetermined circling instrument approach under IFR.

CLASS A AIRSPACE: See Controlled Airspace.

CLASS B AIRSPACE: See Controlled Airspace.

CLASS C AIRSPACE: See Controlled Airspace.

CLASS D AIRSPACE: See Controlled Airspace.

CLASS E AIRSPACE: See Controlled Airspace.

CLASS G AIRSPACE: See Controlled Airspace.

CLEAR ZONE: See Runway Protection Zone.

COMMERCIAL SERVICE AIRPORT: A public airport providing scheduled passenger service that enplanes at least 2,500 annual passengers.

COMMON TRAFFIC ADVISORY FREQUENCY: A radio frequency identified in the appropriate aeronautical chart which is designated for the purpose of transmitting airport advisory information and procedures while operating to or from an uncontrolled airport.

COMPASS LOCATOR (LOM): A low power, low/medium frequency radio-beacon installed in conjunction with the instrument landing system at one or two of the marker sites.

CONICAL SURFACE: An imaginary obstruction-limiting surface defined in FAR Part 77 that extends from the edge of the horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

CONTROLLED AIRPORT: An airport that has an operating airport traffic control tower.

CONTROLLED AIRSPACE: Airspace of defined dimensions within which air traffic control services are provided to instrument flight rules (IFR) and visual flight rules (VFR) flights in accordance with the airspace classification. Controlled airspace in the United States is designated as follows:

- *CLASS A:* Generally, the airspace from 18,000 feet mean sea level (MSL) up to but not including flight level FL600. All persons must operate their aircraft under IFR.

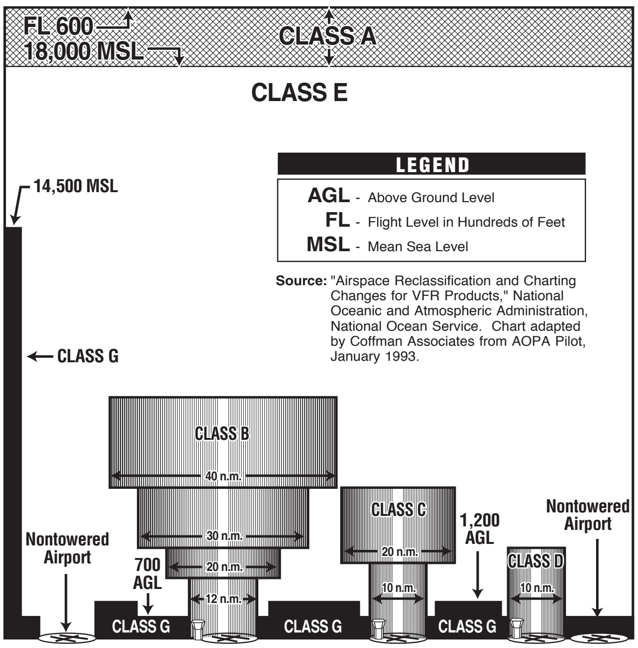
- *CLASS B:* Generally, the airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports. The configuration of Class B airspace is unique to each airport, but typically consists of two or more layers of air space and is designed to contain all published instrument approach procedures to the airport. An air traffic control clearance is required for all aircraft to operate in the area.

- *CLASS C:* Generally, the airspace from the surface to 4,000 feet above the airport elevation (charted as MSL) surrounding those airports that have an operational control tower and radar approach control and are served by a qualifying number of IFR operations or passenger enplanements. Although individually tailored for each airport, Class C airspace typically consists of a surface area with a five nautical mile (nm) radius and an outer area with a 10 nautical mile radius that extends from 1,200 feet to 4,000 feet above the airport elevation. Two-way radio communication is required for all aircraft.

- *CLASS D:* Generally, that airspace from the surface to 2,500 feet above the air port elevation (charted as MSL) surrounding those airports that have an operational control tower. Class D airspace is individually tailored and configured to encompass published instrument approach proce dures. Unless otherwise authorized, all persons must establish two-way radio communication.

- *CLASS E:* Generally, controlled airspace that is not classified as Class A, B, C, or D. Class E airspace extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace. When designated as a surface area, the airspace will be configured to contain all instrument procedures. Class E airspace encompasses all Victor Airways. Only aircraft following instrument flight rules are required to establish two-way radio communication with air traffic control.

- *CLASS G:* Generally, that airspace not classified as Class A, B, C, D, or E. Class G airspace is uncontrolled for all aircraft. Class G airspace extends from the surface to the overlying Class E airspace.



CONTROLLED FIRING AREA: See special-use airspace.

CROSSWIND: A wind that is not parallel to a runway centerline or to the intended flight path of an aircraft.

CROSSWIND COMPONENT: The component of wind that is at a right angle to the runway centerline or the intended flight path of an aircraft.

CROSSWIND LEG: A flight path at right angles to the landing runway off its upwind end. See "traffic pattern."

DECIBEL: A unit of noise representing a level relative to a reference of a sound pressure 20 micro newtons per square meter.

DECISION HEIGHT: The height above the end of the runway surface at which a decision must be made by a pilot during the ILS or Precision Approach Radar approach to either continue the approach or to execute a missed approach.

DECLARED DISTANCES: The distances declared available for the airplane's takeoff runway, takeoff distance, accelerate-stop distance, and landing distance requirements. The distances are:

- *TAKEOFF RUNWAY AVAILABLE (TORA):* The runway length declared available and suitable for the ground run of an airplane taking off;

- *TAKEOFF DISTANCE AVAILABLE (TODA):* The TORA plus the length of any remaining runway and/or clear way beyond the far end of the TORA;

- *ACCELERATE-STOP DISTANCE AVAILABLE (ASDA):* The runway plus stopway length declared available for the acceleration and deceleration of an aircraft aborting a takeoff; and

- *LANDING DISTANCE AVAILABLE (LDA):* The runway length declared available and suitable for landing.

DEPARTMENT OF TRANSPORTATION: The cabinet level federal government organization consisting of modal operating agencies, such as the Federal Aviation Administration, which was established to promote the coordination of federal transportation programs and to act as a focal point for research and development efforts in transportation.

DISCRETIONARY FUNDS: Federal grant funds that may be appropriated to an airport based upon designation by the Secretary of Transportation or Congress to meet a specified national priority such as enhancing capacity, safety, and security, or mitigating noise.

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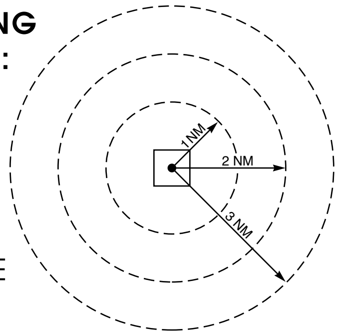
DISPLACED THRESHOLD: A threshold that is located at a point on the runway other than the designated beginning of the runway.

DISTANCE MEASURING EQUIPMENT (DME): Equipment (airborne and ground) used to measure, in nautical miles, the slant range distance of an aircraft from the DME navigational aid.



DNL: The 24-hour average sound level, in A-weighted decibels, obtained after the addition of ten decibels to sound levels for the periods between 10 p.m. and 7 a.m. as averaged over a span of one year. It is the FAA standard metric for determining the cumulative exposure of individuals to noise.

DOWNWIND LEG: A flight path parallel to the landing runway in the direction opposite to landing. The downwind leg normally extends between the crosswind leg and the base leg. Also see "traffic pattern."

EASEMENT: The legal right of one party to use a portion of the total rights in real estate owned by another party. This may include the right of passage over, on, or below the property; certain air rights above the property, including view rights; and the rights to any specified form of development or activity, as well as any other legal rights in the property that may be specified in the easement document.

ELEVATION: The vertical distance measured in feet above mean sea level.

ENPLANED PASSENGERS: The total number of revenue passengers boarding aircraft, including originating, stop-over, and transfer passengers, in scheduled and non-scheduled services.

ENPLANEMENT: The boarding of a passenger, cargo, freight, or mail on an aircraft at an airport.

ENTITLEMENT: Federal funds for which a commercial service airport may be eligible based upon its annual passenger enplanements.

ENVIRONMENTAL ASSESSMENT (EA): An environmental analysis performed pursuant to the National Environmental Policy Act to determine whether an action would significantly affect the environment and thus require a more detailed environmental impact statement.

ENVIRONMENTAL AUDIT: An assessment of the current status of a party's compliance with applicable environmental requirements of a party's environmental compliance policies, practices, and controls.

ENVIRONMENTAL IMPACT STATEMENT (EIS): A document required of federal agencies by the National Environmental Policy Act for major projects ar legislative proposals affecting the environment. It is a tool for decision-making describing the positive and negative effects of a proposed action and citing alternative actions.

ESSENTIAL AIR SERVICE: A federal program which guarantees air carrier service to selected small cities by providing subsidies as needed to prevent these cities from such service.

FEDERAL AVIATION REGULATIONS: The general and permanent rules established by the executive departments and agencies of the Federal Government for aviation, which are published in the Federal Register. These are the aviation subset of the Code of Federal Regulations.

FINAL APPROACH: A flight path in the direction of landing along the extended runway centerline. The final approach normally extends from the base leg to the runway. See "traffic pattern."

FINDING OF NO SIGNIFICANT IMPACT (FONSI): A public document prepared by a Federal agency that presents the rationale why a proposed action will not have a significant effect on the environment and for which an environmental impact statement will not be prepared.

FIXED BASE OPERATOR (FBO): A provider of services to users of an airport. Such services include, but are not limited to, hangaring, fueling, flight training, repair, and maintenance.

FLIGHT LEVEL: A designation for altitude within controlled airspace.

FLIGHT SERVICE STATION: An operations facility in the national flight advisory system which utilizes data interchange facilities for the collection and dissemination of Notices to Airmen, weather, and administrative data and which provides pre-flight and in-flight advisory services to pilots through air and ground based communication facilities.

FRANGIBLE NAVAID: A navigational aid which retains its structural integrity and stiffness up to a designated maximum load, but on impact from a greater load, breaks, distorts, or yields in such a manner as to present the minimum hazard to aircraft.

GENERAL AVIATION: That portion of civil aviation which encompasses all facets of aviation except air carriers holding a certificate of convenience and necessity, and large aircraft commercial operators.

GLIDESLOPE (GS): Provides vertical guidance for aircraft during approach and landing. The glideslope consists of the following:

1. Electronic components emitting signals which provide vertical guidance by reference to airborne instruments during instrument approaches such as ILS; or

2. Visual ground aids, such as VASI, which provide vertical guidance for VFR approach or for the visual portion of an instrument approach and landing.

GLOBAL POSITIONING SYSTEM (GPS): A system of 24 satellites used as reference points to enable navigators equipped with GPS receivers to determine their latitude, longitude, and altitude.

GROUND ACCESS: The transportation system on and around the airport that provides access to and from the airport by ground transportation vehicles for passengers, employees, cargo, freight, and airport services.

HELIPAD: A designated area for the takeoff, landing, and parking of helicopters.

HIGH INTENSITY RUNWAY LIGHTS: The highest classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

HIGH-SPEED EXIT TAXIWAY: A long radius taxiway designed to expedite aircraft turning off the runway after landing (at speeds to 60 knots), thus reducing runway occupancy time.

HORIZONTAL SURFACE: An imaginary obstruction-limiting surface defined in FAR Part 77 that is specified as a portion of a horizontal plane surrounding a runway located 150 feet above the established airport elevation. The specific horizontal dimensions of this surface are a function of the types of approaches existing or planned for the runway.

INSTRUMENT APPROACH PROCEDURE: A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing, or to a point from which a landing may be made visually.

INSTRUMENT FLIGHT RULES (IFR): Procedures for the conduct of flight in weather conditions below Visual Flight Rules weather minimums. The term IFR is often also used to define weather conditions and the type of flight plan under which an aircraft is operating.

INSTRUMENT LANDING SYSTEM (ILS): A precision instrument approach system which normally consists of the following electronic components and visual aids:

1. Localizer.
2. Glide Slope.
3. Outer Marker.
4. Middle Marker.
5. Approach Lights.

INSTRUMENT METEOROLOGICAL CONDITIONS: Meteorological conditions expressed in terms of specific visibility and ceiling conditions that are less than the minimums specified for visual meteorological conditions.

ITINERANT OPERATIONS: Operations by aircraft that are not based at a specified airport.

KNOTS: A unit of speed length used in navigation that is equivalent to the number of nautical miles traveled in one hour.

LANDSIDE: The portion of an airport that provides the facilities necessary for the processing of passengers, cargo, freight, and ground transportation vehicles.

LANDING DISTANCE AVAILABLE (LDA): See declared distances.

LARGE AIRPLANE: An airplane that has a maximum certified takeoff weight in excess of 12,500 pounds.

LOCAL AREA AUGMENTATION SYSTEM: A differential GPS system that provides localized measurement correction signals to the basic GPS signals to improve navigational accuracy, integrity, continuity, and availability.

LOCAL OPERATIONS: Aircraft operations performed by aircraft that are based at the airport and that operate in the local traffic pattern or within sight of the airport, that are known to be departing for or arriving from flights in local practice areas within a prescribed distance from the airport, or that execute simulated instrument approaches at the airport.

LOCAL TRAFFIC: Aircraft operating in the traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from the local practice areas, or aircraft executing practice instrument approach procedures. Typically, this includes touch-and-go training operations.

LOCALIZER: The component of an ILS which provides course guidance to the runway.

LOCALIZER TYPE DIRECTIONAL AID (LDA): A facility of comparable utility and accuracy to a localizer, but is not part of a complete ILS and is not aligned with the runway.

LONG RANGE NAVIGATION SYSTEM (LORAN): Long range navigation is an electronic navigational aid which determines aircraft position and speed by measuring the difference in the time of reception of synchronized pulse signals from two fixed transmitters. Loran is used for enroute navigation.

LOW INTENSITY RUNWAY LIGHTS: The lowest classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

MEDIUM INTENSITY RUNWAY LIGHTS: The middle classification in terms of intensity or brightness for lights designated for use in delineating the sides of a runway.

MICROWAVE LANDING SYSTEM (MLS): An instrument approach and landing system that provides precision guidance in azimuth, elevation, and distance measurement.

MILITARY OPERATIONS: Aircraft operations that are performed in military aircraft.

MILITARY OPERATIONS AREA (MOA): See special-use airspace.

MILITARY TRAINING ROUTE: An air route depicted on aeronautical charts for the conduct of military flight training at speeds above 250 knots.

MISSED APPROACH COURSE (MAC): The flight route to be followed if, after an instrument approach, a landing is not affected, and occurring normally:

1. When the aircraft has descended to the decision height and has not established visual contact; or

2. When directed by air traffic control to pull up or to go around again.

MOVEMENT AREA: The runways, taxiways, and other areas of an airport which are utilized for taxiing/hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and parking areas. At those airports with a tower, air traffic control clearance is required for entry onto the movement area.

NATIONAL AIRSPACE SYSTEM: The network of air traffic control facilities, air traffic control areas, and navigational facilities through the U.S.

NATIONAL PLAN OF INTEGRATED AIRPORT SYSTEMS: The national airport system plan developed by the Secretary of Transportation on a biannual basis for the development of public use airports to meet national air transportation needs.

NATIONAL TRANSPORTATION SAFETY BOARD: A federal government organization established to investigate and determine the probable cause of transportation accidents, to recommend equipment and procedures to enhance transportation safety, and to review on appeal the suspension or revocation of any certificates or licenses issued by the Secretary of Transportation.

NAUTICAL MILE: A unit of length used in navigation which is equivalent to the distance spanned by one minute of arc in latitude, that is, 1,852 meters or 6,076 feet. It is equivalent to approximately 1.15 statute mile.

NAVAID: A term used to describe any electrical or visual air navigational aids, lights, signs, and associated supporting equipment (i.e. PAPI, VASI, ILS, etc.)

NOISE CONTOUR: A continuous line on a map of the airport vicinity connecting all points of the same noise exposure level.

NON-DIRECTIONAL BEACON (NDB): A beacon transmitting nondirectional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine his or her bearing to and from the radio beacon and home on, or track to, the station. When the radio beacon is installed in conjunction with the Instrument Landing System marker, it is normally called a Compass Locator.

NON-PRECISION APPROACH PROCEDURE: A standard instrument approach procedure in which no electronic glide slope is provided, such as VOR, TACAN, NDB, or LOC.

NOTICE TO AIRMEN: A notice containing information concerning the establishment, condition, or change in any component of or hazard in the National Airspace System, the timely knowledge of which is considered essential to personnel concerned with flight operations.

OBJECT FREE AREA (OFA): An area on the ground centered on a runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.

OBSTACLE FREE ZONE (OFZ): The airspace below 150 feet above the established airport elevation and along the runway and extended runway centerline that is required to be kept clear of all objects, except for frangible visual NAVAIDs that need to be located in the OFZ because of their function,
in order to provide clearance for aircraft landing or taking off from the runway, and for missed approaches.

OPERATION: A take-off or a landing.

OUTER MARKER (OM): An ILS navigation facility in the terminal area navigation system located four to seven miles from the runway edge on the extended centerline, indicating to the pilot that he/she is passing over the facility and can begin final approach.

PILOT CONTROLLED LIGHTING: Runway lighting systems at an airport that are controlled by activating the microphone of a pilot on a specified radio frequency.

PRECISION APPROACH: A standard instrument approach procedure which provides runway alignment and glide slope (descent) information. It is categorized as follows:

- *CATEGORY I (CAT I):* A precision approach which provides for approaches with a decision height of not less than 200 feet and visibility not less than 1/2 mile or Runway Visual Range (RVR) 2400 (RVR 1800) with operative touchdown zone and runway centerline lights.
- *CATEGORY II (CAT II):* A precision approach which provides for approaches with a decision height of not less than 100 feet and visibility not less than 1200 feet RVR.
- *CATEGORY III (CAT III):* A precision approach which provides for approaches with minima less than Category II.

PRECISION APPROACH PATH INDICATOR (PAPI): A lighting system providing visual approach slope guidance to aircraft during a landing approach. It is similar to a VASI but provides a sharper transition between the colored indicator lights.

PRECISION APPROACH RADAR: A radar facility in the terminal air traffic control system used to detect and display with a high degree of accuracy the direction, range, and elevation of an aircraft on the final approach to a runway.

PRECISION OBJECT FREE AREA (POFA): An area centered on the extended runway centerline, beginning at the runway threshold and extending behind the runway threshold that is 200 feet long by 800 feet wide. The POFA is a clearing standard which requires the POFA to be kept clear of above ground objects protruding above the runway safety area edge elevation (except for frangible NAVAIDS). The POFA applies to all new authorized instrument approach procedures with less than 3/4 mile visibility.

PRIMARY AIRPORT: A commercial service airport that enplanes at least 10,000 annual passengers.

PRIMARY SURFACE: An imaginary obstruction limiting surface defined in FAR Part 77 that is specified as a rectangular surface longitudinally centered about a runway. The specific dimensions of this surface are a function of the types of approaches existing or planned for the runway.

PROHIBITED AREA: See special-use airspace.

PVC: Poor visibility and ceiling. Used in determining Annual Sevice Volume. PVC conditions exist when the cloud ceiling is less than 500 feet and visibility is less than one mile.

RADIAL: A navigational signal generated by a Very High Frequency Omni-directional Range or VORTAC station that is measured as an azimuth from the station.

REGRESSION ANALYSIS: A statistical technique that seeks to identify and quantify the relationships between factors associated with a forecast.

REMOTE COMMUNICATIONS OUTLET (RCO): An unstaffed transmitter receiver/facility remotely controlled by air traffic personnel. RCOs serve flight service stations (FSSs). RCOs were established to provide ground-to-ground communications between air traffic control specialists and pilots at satellite airports for delivering enroute clearances, issuing departure authorizations, and acknowledging instrument flight rules cancellations or departure/landing times.

REMOTE TRANSMITTER/RECEIVER (RTR): See remote communications outlet. RTRs serve ARTCCs.

RELIEVER AIRPORT: An airport to serve general aviation aircraft which might otherwise use a congested air-carrier served airport.

RESTRICTED AREA: See special-use airspace.

RNAV: Area navigation - airborne equipment which permits flights over determined tracks within prescribed accuracy tolerances without the need to overfly ground-based navigation facilities. Used enroute and for approaches to an airport.

RUNWAY: A defined rectangular area on an airport prepared for aircraft landing and takeoff. Runways are normally numbered in relation to their magnetic direction, rounded off to the nearest 10 degrees. For example, a runway with a magnetic heading of 180 would be designated Runway 18. The runway heading on the opposite end of the runway is 180 degrees from that runway end. For example, the opposite runway heading for Runway 18 would be Runway 36 (magnetic heading of 360). Aircraft can takeoff or land from either end of a runway, depending upon wind direction.

RUNWAY ALIGNMENT INDICATOR LIGHT: A series of high intensity sequentially flashing lights installed on the extended centerline of the runway usually in conjunction with an approach lighting system.

RUNWAY END IDENTIFIER LIGHTS (REIL): Two synchronized flashing lights, one on each side of the runway threshold, which provide rapid and positive identification of the approach end of a particular runway.

RUNWAY GRADIENT: The average slope, measured in percent, between the two ends of a runway.

RUNWAY PROTECTION ZONE (RPZ): An area off the runway end to enhance the protection of people and property on the ground. The RPZ is trapezoidal in shape. Its dimensions are determined by the aircraft approach speed and runway approach type and minima.

RUNWAY SAFETY AREA (RSA): A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.

RUNWAY VISIBILITY ZONE (RVZ): An area on the airport to be kept clear of permanent objects so that there is an unobstructed line-of-site from any point five feet above the runway centerline to any point five feet above an intersecting runway centerline.

RUNWAY VISUAL RANGE (RVR): An instrumentally derived value, in feet, representing the horizontal distance a pilot can see down the runway from the runway end.

SCOPE: The document that identifies and defines the tasks, emphasis, and level of effort associated with a project or study.

SEGMENTED CIRCLE: A system of visual indicators designed to provide traffic pattern information at airports without operating control towers.

SHOULDER: An area adjacent to the edge of paved runways, taxiways, or aprons providing a transition between the pavement and the adjacent surface; support for aircraft running off the pavement; enhanced drainage; and blast protection. The shoulder does not necessarily need to be paved.

SLANT-RANGE DISTANCE: The straight line distance between an aircraft and a point on the ground.

SMALL AIRPLANE: An airplane that has a maximum certified takeoff weight of up to 12,500 pounds.

SPECIAL-USE AIRSPACE: Airspace of defined dimensions identified by a surface area wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. Special-use airspace classifications include:

- *ALERT AREA:* Airspace which may contain a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft.

- *CONTROLLED FIRING AREA:* Airspace wherein activities are conducted under conditions so controlled as to eliminate hazards to nonparticipating aircraft and to ensure the safety of persons or property on the ground.

- *MILITARY OPERATIONS AREA (MOA):* Designated airspace with defined vertical and lateral dimensions established outside Class A airspace to separate/segregate certain military activities from instrument flight rule (IFR) traffic and to identify for visual flight rule (VFR) traffic where these activities are conducted.

- *PROHIBITED AREA:* Designated airspace within which the flight of aircraft is prohibited.

- *RESTRICTED AREA:* Airspace designated under Federal Aviation Regulation (FAR) 73, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Most restricted areas are designated joint use. When not in use by the using agency, IFR/VFR operations can be authorized by the controlling air traffic control facility.

- *WARNING AREA:* Airspace which may contain hazards to nonparticipating aircraft.

STANDARD INSTRUMENT DEPARTURE (SID): A preplanned coded air traffic control IFR departure routing, preprinted for pilot use in graphic and textual form only.

STANDARD TERMINAL ARRIVAL (STAR): A preplanned coded air traffic control IFR arrival routing, preprinted for pilot use in graphic and textual or textual form only.

STOP-AND-GO: A procedure wherein an aircraft will land, make a complete stop on the runway, and then commence a takeoff from that point. A stop-and-go is recorded as two operations: one operation for the landing and one operation for the takeoff.

STOPWAY: An area beyond the end of a takeoff runway that is designed to support an aircraft during an aborted takeoff without causing structural damage to the aircraft. It is not to be used for takeoff, landing, or taxiing by aircraft.

STRAIGHT-IN LANDING/APPROACH: A landing made on a runway aligned within 30 degrees of the final approach course following completion of an instrument approach.

TACTICAL AIR NAVIGATION (TACAN): An ultra-high frequency electronic air navigation system which provides suitably-equipped aircraft a continuous indication of bearing and distance to the TACAN station.

TAKEOFF RUNWAY AVAILABLE (TORA): See declared distances.

TAKEOFF DISTANCE AVAILABLE (TODA): See declared distances.

TAXILANE: The portion of the aircraft parking area used for access between taxiways and aircraft parking positions.

TAXIWAY: A defined path established for the taxiing of aircraft from one part of an airport to another.

TAXIWAY SAFETY AREA (TSA): A defined surface alongside the taxiway prepared or suitable for reducing the risk of damage to an airplane unintentionally departing the taxiway.

TERMINAL INSTRUMENT PROCEDURES: Published flight procedures for conducting instrument approaches to runways under instrument meteorological conditions.

TERMINAL RADAR APPROACH CONTROL: An element of the air traffic control system responsible for monitoring the en-route and terminal segment of air traffic in the airspace surrounding airports with moderate to high-levels of air traffic.

TETRAHEDRON: A device used as a landing direction indicator. The small end of the tetrahedron points in the direction of landing.

THRESHOLD: The beginning of that portion of the runway available for landing. In some instances the landing threshold may be displaced.

TOUCH-AND-GO: An operation by an aircraft that lands and departs on a runway without stopping or exiting the runway. A touch-and-go is recorded as two operations: one operation for the landing and one operation for the takeoff.

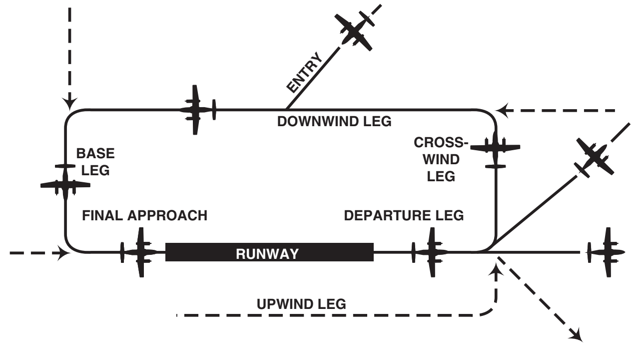
TOUCHDOWN: The point at which a landing aircraft makes contact with the runway surface.

TOUCHDOWN ZONE (TDZ): The first 3,000 feet of the runway beginning at the threshold.

TOUCHDOWN ZONE ELEVATION (TDZE): The highest elevation in the touchdown zone.

TOUCHDOWN ZONE (TDZ) LIGHTING: Two rows of transverse light bars located symmetrically about the runway centerline normally at 100-foot intervals. The basic system extends 3,000 feet along the runway.

TRAFFIC PATTERN: The traffic flow that is prescribed for aircraft landing at or taking off from an airport. The components of a typical traffic pattern are the upwind leg, crosswind leg, downwind leg, base leg, and final approach.

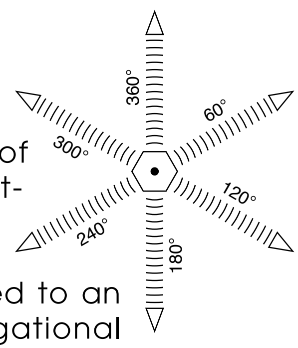


UNCONTROLLED AIRPORT: An airport without an air traffic control tower at which the control of Visual Flight Rules traffic is not exercised.

UNCONTROLLED AIRSPACE: Airspace within which aircraft are not subject to air traffic control.

UNIVERSAL COMMUNICATION (UNICOM): A nongovernment communication facility which may provide airport information at certain airports. Locations and frequencies of UNICOM's are shown on aeronautical charts and publications.

UPWIND LEG: A flight path parallel to the landing runway in the direction of landing. See "traffic pattern."



VECTOR: A heading issued to an aircraft to provide navigational guidance by radar.

VERY HIGH FREQUENCY/ OMNIDIRECTIONAL RANGE STATION (VOR): A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north. Used as the basis for navigation in the national airspace system. The VOR periodically identifies itself by Morse Code and may have an additional voice identification feature.

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VERY HIGH FREQUENCY OMNI-DIRECTIONAL RANGE STATION/ TACTICAL AIR NAVIGATION (VORTAC): A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance-measuring equipment (DME) at one site.

VICTOR AIRWAY: A control area or portion thereof established in the form of a corridor, the centerline of which is defined by radio navigational aids.

VISUAL APPROACH: An approach wherein an aircraft on an IFR flight plan,
operating in VFR conditions under the control of an air traffic control facility and having an air traffic control authorization, may proceed to the airport of destination in VFR conditions.

VISUAL APPROACH SLOPE INDICATOR (VASI): An airport lighting facility providing vertical visual approach slope guidance to aircraft during approach to landing by radiating a directional pattern of high intensity red and white focused light beams which indicate to the pilot that he is on path if he sees red/white, above path if white/white, and below path if red/red. Some airports serving large aircraft have three-bar VASI's which provide two visual guide paths to the same runway.

VISUAL FLIGHT RULES (VFR): Rules that govern the procedures for conducting flight under visual conditions. The term VFR is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.

VISUAL METEOROLOGICAL CONDITIONS: Meteorological conditions expressed in terms of specific visibility and ceiling conditions which are equal to or greater than the threshold values for instrument meteorological conditions.

VOR: See "Very High Frequency Omnidirectional Range Station."

VORTAC: See "Very High Frequency Omnidirectional Range Station/Tactical Air Navigation."

WARNING AREA: See special-use airspace.

WIDE AREA AUGMENTATION SYSTEM: An enhancement of the Global Positioning System that includes integrity broadcasts, differential corrections, and additional ranging signals for the purpose of providing the accuracy, integrity, availability, and continuity required to support all phases of flight.

Abbreviations

AC: advisory circular

ADF: automatic direction finder

ADG: airplane design group

AFSS: automated flight service station

AGL: above ground level

AIA: annual instrument approach

AIP: Airport Improvement Program

AIR-21: Wendell H. Ford Aviation Investment and Reform Act for the 21st Century

ALS: approach lighting system

ALSF-1: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT I configuration)

ALSF-2: standard 2,400-foot high intensity approach lighting system with sequenced flashers (CAT II configuration)

APV: instrument approach procedure with vertical guidance

ARC: airport reference code

ARFF: aircraft rescue and firefighting

ARP: airport reference point

ARTCC: air route traffic control center

ASDA: accelerate-stop distance available

ASR: airport surveillance radar

ASOS: automated surface observation station

ATCT: airport traffic control tower

ATIS: automated terminal information service

AVGAS: aviation gasoline - typically 100 low lead (100LL)

AWOS: automated weather observation station

BRL: building restriction line

CFR: Code of Federal Regulations

CIP: capital improvement program

DME: distance measuring equipment

DNL: day-night noise level

DWL: runway weight bearing capacity for aircraft with dual-wheel type landing gear

DTWL: runway weight bearing capacity fo aircraft with dual-tandem type landing gear

FAA: Federal Aviation Administration

FAR: Federal Aviation Regulation

FBO: fixed base operator
FY: fiscal year

GPS: global positioning system

GS: glide slope

HIRL: high intensity runway edge lighting

IFR: instrument flight rules (FAR Part 91)

ILS: instrument landing system

IM: inner marker

LDA: localizer type directional aid

LDA: landing distance available

LIRL: low intensity runway edge lighting

LMM: compass locator at middle marker

LOC: ILS localizer

LOM: compass locator at ILS outer marker

LORAN: long range navigation

MALS: medium intensity approach lighting system

MALSR: medium intensity approach lighting system with runway alignment indicator lights

MIRL: medium intensity runway edge lighting

MITL: medium intensity taxiway edge lighting

MLS: microwave landing system

MM: middle marker

MOA: military operations area

MSL: mean sea level

NAVAID: navigational aid

NDB: nondirectional radio beacon

NM: nautical mile (6,076 .1 feet)

NPES: National Pollutant Discharge Elimination System

NPIAS: National Plan of Integrated Airport Systems

NPRM: notice of proposed rulemaking

ODALS: omnidirectional approach lighting system

OFA: object free area

OFZ: obstacle free zone

OM: outer marker

PAC: planning advisory committee

PAPI: precision approach path indicator

PFC: porous friction course

PFC: passenger facility charge

PCL: pilot-controlled lighting

PIW: public information workshop

PLASI: pulsating visual approach slope indicator

POFA: precision object free area

PVASI: pulsating/steady visual approach slope indicator

PVC: Poor visibility and ceiling.

RCO: remote communications outlet

REIL: runway end identifier lighting

RNAV: area navigation

RPZ: runway protection zone

RSA: Runway Safety Area

RTR: remote transmitter/receiver

RVR: runway visibility range

RVZ: runway visibility zone

SALS: short approach lighting system

SASP: state aviation system plan

SEL: sound exposure level
SID: standard instrument departure

SM: statute mile (5,280 feet)

SRE: snow removal equipment

SSALF: simplified short approach lighting system with sequenced flashers

SSALR: simplified short approach lighting system with runway alignment indicator lights

STAR: standard terminal arrival route

SWL: runway weight bearing capacity for aircraft with single-wheel type landing gear

STWL: runway weight bearing capacity for aircraft with single-wheel tandem type landing gear

TACAN: tactical air navigational aid

TDZ: touchdown zone

TDZE: touchdown zone elevation

TAF: Federal Aviation Administration (FAA) Terminal Area Forecast

TODA: takeoff distance available

TORA: takeoff runway available

TRACON: terminal radar approach control

VASI: visual approach slope indicator

VFR: visual flight rules (FAR Part 91)

VHF: very high frequency

VOR: very high frequency omni-directional range

VORTAC: VOR and TACAN collocated

Arlington Municipal Airport

Appendix B

ENVIRONMENTAL EVALUATION

Appendix B
ENVIRONMENTAL EVALUATION

A review of the potential environmental impacts associated with proposed airport projects is an essential consideration in the airport master planning process. The primary purpose of this evaluation is to review the proposed improvement program for Arlington Municipal Airport to determine whether the proposed actions could, individually or collectively, have the potential to significantly affect the quality of the environment.

Construction of the improvements depicted on the Airport Layout Plan will require compliance with the *National Environmental Policy Act (NEPA) of 1969*, as amended, to receive federal financial assistance. For projects not "categorically excluded" under Federal Aviation Administration (FAA) Order 1050.1E, *Environmental Impacts: Policies and Procedures*, compliance with NEPA is generally satisfied through the preparation of an Environmental Assessment (EA). Instances in which significant environmental impacts are expected, an Environmental Impact Statement (EIS) may be required. While this portion of the master plan is not designed to satisfy the NEPA requirements for a categorical exclusion, EA, or EIS, it is intended to supply a preliminary review of environmental issues that would need to be analyzed in more detail within the NEPA process. This evaluation considers all environmental categories required for the NEPA process as outlined in FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures* and FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions.* Of the 20 plus environmental categories, the following resources are not found within the airport environs.

- Coastal Resources
- Prime or Unique Farmland (as designated by the Natural Resource Conservation Service)
- Wild and Scenic Rivers
- Environmental Justice Areas

The following sections describe potential impacts to the remaining resources (as outlined within Appendix A of FAA Order 1050.1E) as development at the airport is undertaken. **Exhibit B1** depicts the proposed future development of the airport.

AIR QUALITY

The U.S. Environmental Protection Agency (EPA) has adopted air quality standards that specify the maximum permissible near-term and long-term concentrations of various air contaminants. The National Ambient Air Quality Standards (NAAQS) consist of primary and secondary standards for each pollutant as presented in **Table B1**. Primary air quality standards are established at levels to protect the public health from harm with an adequate margin of safety. Secondary standards are set at levels necessary to protect the public health and welfare from any known or anticipated adverse effects of a pollutant. All areas of the country are required to demonstrate attainment with the NAAQS. Texas has adopted the federal ambient air quality standards.

TABLE B1
State Ambient Air Quality Standards

Pollutant	Averaging Time	Primary Standard	Secondary Standard
Carbon Monoxide (CO) in parts per million (ppm)	8-hour 1-hour	9 35	– –
Nitrogen Dioxide (NO_x) in ppm	Annual	0.053	0.053
Ozone (O_3) in ppm	1-hour 8-hour	0.12 0.08	0.12 0.08
Lead (Pb) in micrograms per cubic meter	Quarterly Average	1.5	1.5
Particulate Matter (PM_{10}) in micrograms per cubic meter	Annual 24-hour	50 150	50 150
Particulate Matter ($PM_{2.5}$) in micrograms per cubic meter	Annual 24-Hour	65 15	65 15
Sulfur Dioxide (SO_x) in ppm	Annual 24-hour 3-hour	0.03 0.14 –	– – 0.50

Source: U.S. Environmental Protection Agency

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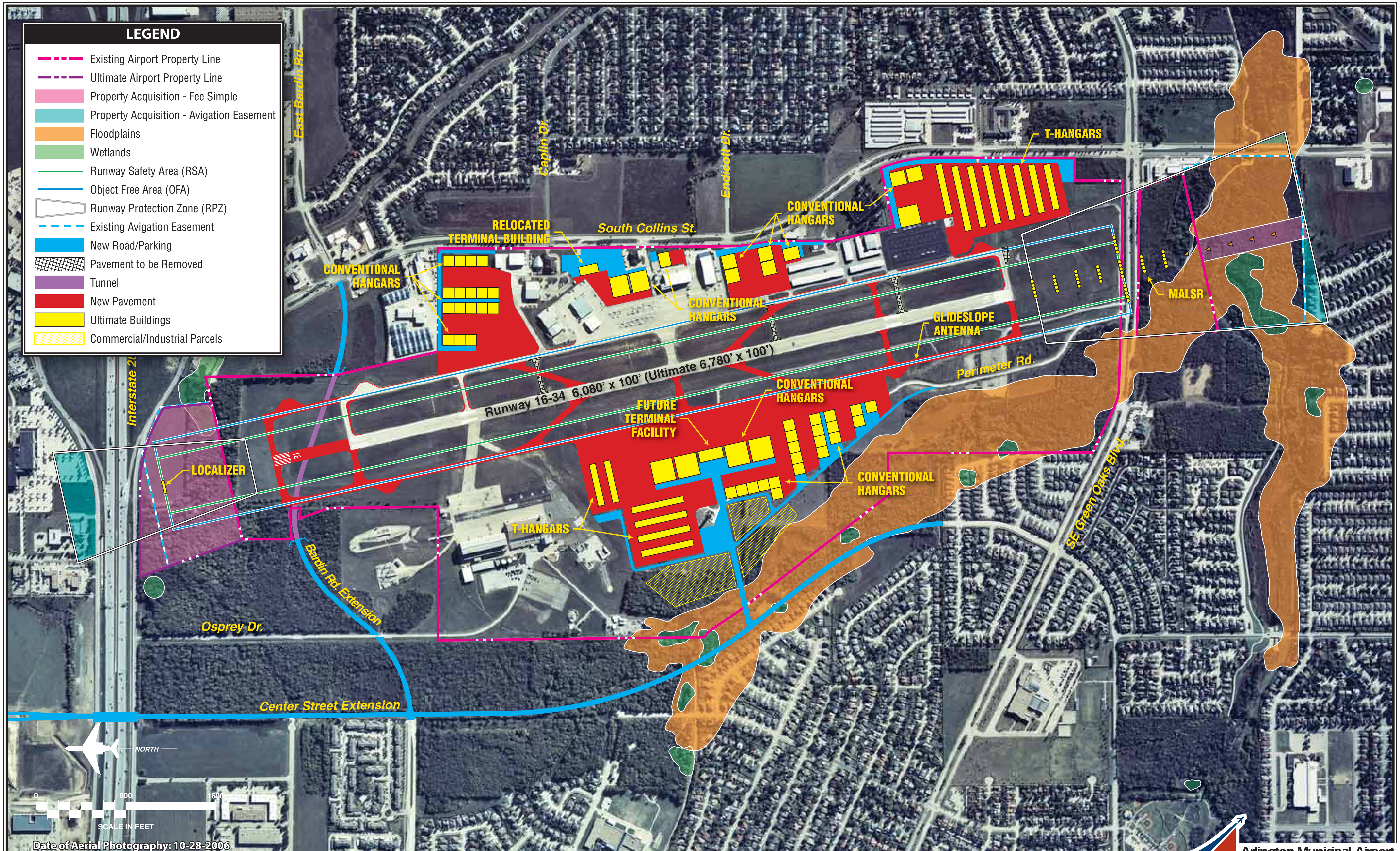

Exhibit B1
MASTER PLAN CONCEPT

The federal air quality standards focus on limiting the quantity of six criteria pollutants:

- Ozone (O_3)
- Carbon Monoxide (CO)
- Sulfur Dioxide (SO_x)
- Nitrogen Dioxide (NO_x)
- Particulate Matter (PM_{10} and $PM_{2.5}$)
- Lead (Pb)

Air contaminants increase the aggravation and production of respiratory and cardiopulmonary diseases. The standards also establish the level of air quality which is necessary to protect the public health and welfare including, among other things, effects on crops, vegetation, wildlife, visibility, and climate, as well as effects on materials, economic values, and on personal comfort and well-being.

Potentially significant air quality impacts associated with an FAA project or action would occur if the project or action exceeds one or more of the NAAQS for any of the time periods analyzed.

Arlington Municipal Airport is located in Tarrant County, which is in nonattainment for ozone. It is not anticipated that the proposed improvements at the airport will result in the NAAQS being exceeded; however, further analysis will need to be undertaken to assess potential air quality impacts.

COMPATIBLE LAND USE AND NOISE

The degree of annoyance which people suffer from aircraft noise varies depending on their activities at any given time. People rarely are as disturbed by aircraft noise when they are shopping, working, or driving, as when at home. Transient hotel and motel residents seldom express as much concern with aircraft noise as do permanent residents of an area.

The concept of *land use compatibility* has arisen from this systematic variation in human tolerance to aircraft. **Exhibit B2** contains compatible land use information as a function of day-night sound events. Yearly day-night average sound level (DNL) accounts for the increased sensitivity to noise at night (10:00 p.m. to 7:00 a.m.) and is the metric preferred by the FAA, EPA, and Department of Housing and Urban Development (HUD), among others, as an appropriate measure of cumulative noise exposure. The range of DNL values in the exhibit reflects the statistical variability for the response of large groups of people to noise. Any particular DNL level may not, therefore, accurately assess an individual=s perception of an actual noise environment. Compatible or noncompatible land use is determined by comparing the predicted or measured DNL values at a site to the values listed in the exhibit.

The guidelines provided on **Exhibit B2** are generalized for use across the country. Some people, even entire communities, may be more or less sensitive to noise than others. Noise sensitivity within an individual land use class may also vary. For example, occupants of an older, poorly insulated home, or occupants of a mobile home may be more sensitive to noise than

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LAND USE	Yearly Day-Night Average Sound Level (DNL) in Decibels					
	Below 65	65-70	70-75	75-80	80-85	Over 85
RESIDENTIAL						
Residential, other than mobile homes and transient lodgings	Y	N[1]	N[1]	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N[1]	N[1]	N[1]	N	N
PUBLIC USE						
Schools	Y	N[1]	N[1]	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Government services	Y	Y	25	30	N	N
Transportation	Y	Y	Y[2]	Y[3]	Y[4]	Y[4]
Parking	Y	Y	Y[2]	Y[3]	Y[4]	N
COMMERCIAL USE						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail-building materials, hardware and farm equipment	Y	Y	Y[2]	Y[3]	Y[4]	N
Retail trade-general	Y	Y	25	30	N	N
Utilities	Y	Y	Y[2]	Y[3]	Y[4]	N
Communication	Y	Y	25	30	N	N
MANUFACTURING AND PRODUCTION						
Manufacturing, general	Y	Y	Y[2]	Y[3]	Y[4]	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y[6]	Y[7]	Y[8]	Y[8]	Y[8]
Livestock farming and breeding	Y	Y[6]	Y[7]	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
RECREATIONAL						
Outdoor sports arenas and spectator sports	Y	Y[5]	Y[5]	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

The designations contained in this table do not constitute a federal determination that any use of land covered by the program is acceptable under federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally-determined land uses for those determined to be appropriate by local authorities in response to locally-determined needs and values in achieving noise compatible land uses.

See other side for notes and key to table.

Arlington Municipal Airport

Exhibit B2

LAND USE COMPATIBILITY GUIDELINES

KEY

Y (Yes)	Land Use and related structures compatible without restrictions.
N (No)	Land Use and related structures are not compatible and should be prohibited.
NLR	Noise Level Reduction (outdoor-to-indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25, 30, 35	Land Use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structure.

NOTES

1 Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB, respectively, should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB; thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.

2 Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.

3 Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.

4 Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.

5 Land use compatible provided special sound reinforcement systems are installed.

6 Residential buildings require a NLR of 25.

7 Residential buildings require a NLR of 30.

8 Residential buildings not permitted.

Source: ***14 CFR Part 150***, Appendix A, Table 1.

those in a new, well-insulated, energy-efficient home.

Experience has shown that new residential development should be prohibited in areas subject to noise exceeding 65 DNL, unless local conditions indicate that soundproofing residences would prevent homes from being adversely impacted. The most obvious exception would be the presence of high background noise levels which are often found in high-density urban areas or adjacent to major arterial streets or highways.

Exhibit B3 depicts the anticipated noise contours for the airport in the year 2012. These contours were developed based on the potential ultimate runway length and the future forecasts of aviation activity prepared for this planning study. As indicated on the exhibit, the 65 DNL noise contour extends off airport property to the north and south. Land uses contained within this contour of significance include industrial uses to the north and recreational uses (Line Creek Linear Park) to the south. No noise-sensitive development, such as homes, religious institutions, or schools, is located within this significant noise impact area.

SECTION 4(f) PROPERTIES

Section 4(f) of the Department of Transportation (DOT) Act, which was recodified and renumbered as Section 303(c) of 49 USC, provides that the Secretary of Transportation will not approve any program or project that requires the use of any publicly owned land from a historic site, public park, recreation area, or waterfowl and wildlife refuge of national, state, regional, or local importance unless there is no feasible and prudent alternative to the use of such land, and the project includes all possible planning to minimize harm resulting from the use.

A significant impact to a Section 4(f) property would occur if a project involves either more than a minimal use of a Section 4(f) property or is deemed a "constructive use," thereby substantially impairing the Section 4(f) property, and mitigation measures do not eliminate or reduce the effects. Substantial impairment would occur when impacts to Section 4(f) lands are sufficiently serious so that the value of the site in terms of its prior significance and enjoyment are reduced or lost.

As described within Chapter One, the Fish Creek Linear Park is located immediately south of the airport. Avigation easements have been acquired for most of the portions of the park that fall within the RPZ for Runway 16-34; however, as indicated on Exhibit B1, there is an area east of South Collins Street which is contained within the RPZ, but not within the existing avigation easement coverage area. It is proposed that this portion of the RPZ be included within the current easement. Additionally, as part of the proposed airport development, it is recommended that portions of this park be acquired to allow for the proposed medium intensity approach lighting system with runway alignment lights (MALSR) system. Further coordination with the City of Arlington

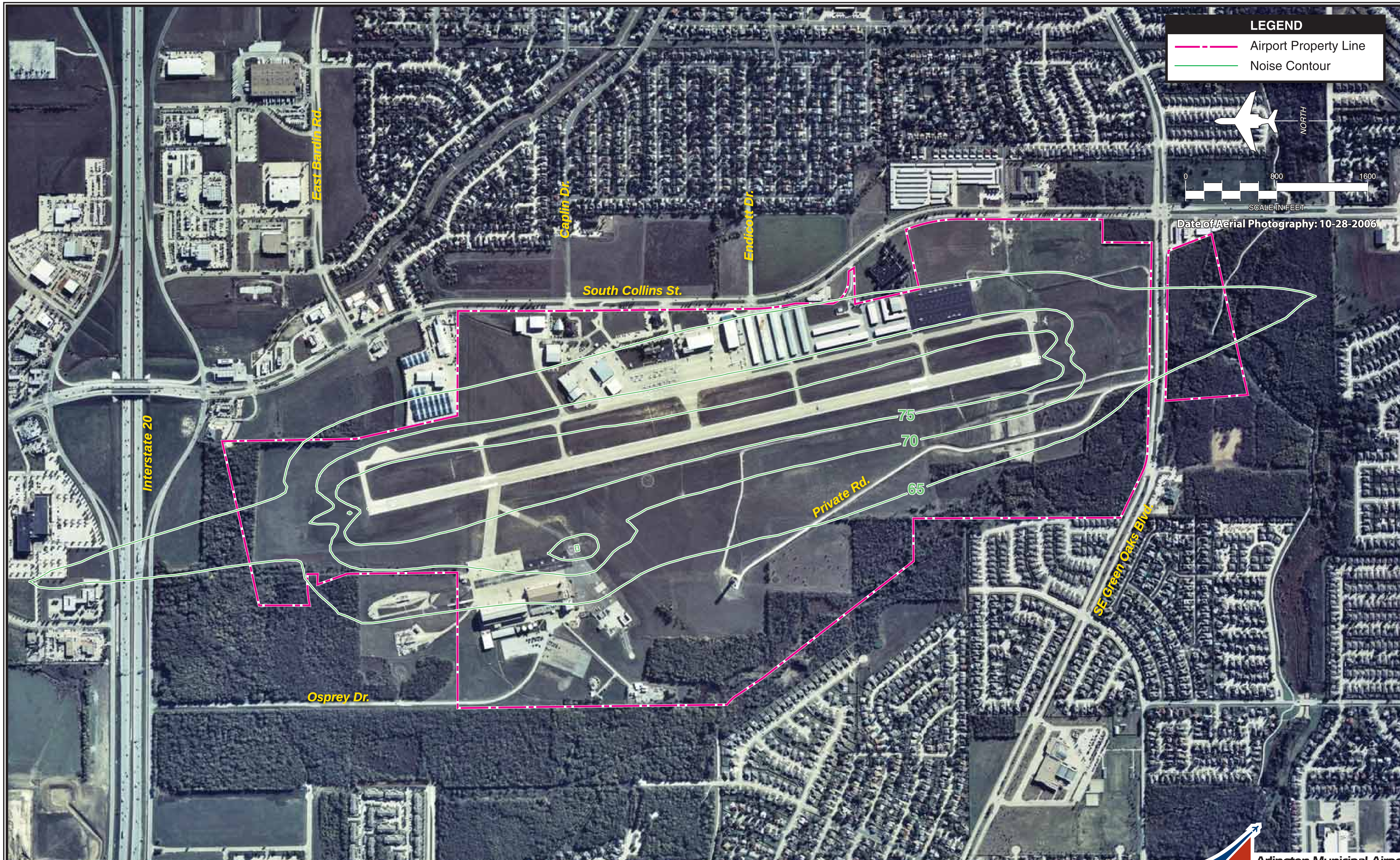

Exhibit B3
NOISE CONTOUR

Parks and Recreation Department should be undertaken to determine whether these projects would result in more than a minimal use of the park, thereby requiring additional Section 4(f) documentation and analysis.

FISH, WILDLIFE, AND PLANTS

A number of acts and executive orders have been put into place to protect threatened or endangered species and their habitat. Following is a brief description of these various levels of protection:

- Section 7 of the *Endangered Species Act* (ESA), as amended, applies to federal agency actions and sets forth requirements for consultation to determine if the proposed action "may affect" a federally endangered or threatened species. If an agency determines that an action "may affect" a federally protected species, then Section 7(a)(2) requires each agency to consult with the U.S. Fish and Wildlife Service (FWS) or the National Marine Fisheries Service (NMFS), as appropriate, to ensure that any action the agency authorizes, funds, or carries out is not likely to jeopardize the continued existence of any federally listed endangered or threatened species, or result in the destruction or adverse modification of critical habitat. If a species has been listed as a candidate species, Sec. 7 (a)(4) states that each agency must confer with the FWS and/or NMFS.

- The *Sikes Act* and various amendments authorize states to prepare statewide wildlife conservation plans, and the Department of Defense (DOD) to prepare similar plans, for resources under their jurisdiction. Airport improvement projects should be checked for consistency with the State or DOD Wildlife Conservation Plans where such plans exist.

- The *Fish and Wildlife Coordination Act* requires that agencies consult with the state wildlife agencies and the Department of the Interior concerning the conservation of wildlife resources where the water of any stream or other water body is proposed to be controlled or modified by a federal agency or any public or private agency operating under a federal permit.

- The *Migratory Bird Treaty Act* (MBTA) prohibits private parties and federal agencies in certain judicial circuits from intentionally taking a migratory bird, their eggs, or nests. The MBTA prohibits activities which would harm migratory birds, their eggs, or nests unless the Secretary of the Interior authorizes such activities under a special permit.

- Executive Order 13112, *Invasive Species*, directs federal agencies to use relevant programs and authorities, to the extent practicable and subject to available resources, to prevent the introduction of invasive species and provide for restoration of native species and habitat conditions in ecosystems that have been invaded. The FAA is to identify proposed actions that may involve risks of introducing invasive species on native habitat and populations. "Introduction" is the intentional or unintentional escape, release, dissemination, or placement of a species into an ecosystem as a result of human activity. "Invasive Species" are alien species whose introduction does, or is likely to, cause economic or environmental harm or harm to human health.

According to FAA Order 1050.1E, a significant impact to listed threatened or endangered species would occur when the FWS or NMFS determines that the proposed action would likely jeopardize the continued existence of the species in question, or would result in the destruction or adverse modification of critical habitat for the species. However, an action need not involve a threat to extinction to federally listed species to result in a significant impact; lesser impacts, including impacts on non-listed species, could also constitute a significant impact.

As described within Chapter One, a number of federally and state-listed species are present within Tarrant County. Previous coordination undertaken with the FWS for runway development projects and the installation of the airport's instrument landing system (ILS) determined that impacts to listed species are not anticipated within the airport environs. As additional development is undertaken at the airport, these findings will need to be revisited, especially in areas which are previously undeveloped. These areas could include those on the west side of the airport, the area for the proposed MALSR, and the area which contains the extended runway safety area.

FLOODPLAINS

Executive Order 11988 directs federal agencies to take action to reduce the risk of flood loss, minimize the impact of floods on human safety, health, and welfare, and restore and preserve the natural and beneficial values served by the floodplains. DOT Order 5650.2 contains DOT=s policies and procedures for implementing the executive order. Agencies are required to make a finding that there is no practicable alternative before taking action that would encroach on a base floodplain.

Floodplain impacts would be considered significant if the encroachment would result in either: (1) a high probability of loss of human life; or (2) substantial encroachment-associated costs or damage, including interrupting aircraft service or loss of a vital transportation facility; or (3) adverse impacts on natural and beneficial floodplain values.

As depicted on **Exhibit B1** and discussed within Chapter One, a designated 100-year floodplain is present in western and southern portions of airport property. The only development proposed with these floodplain areas is the installation of the MALSR system. Further analysis may be needed to determine potential impacts to natural and beneficial floodplain values resulting from this installation.

HISTORICAL, ARCHITECTURAL, AND CULTURAL RESOURCES

Determination of a project=s environmental impact to historic and cultural resources is made under guidance in the *National Historic Preservation Act (NHPA) of 1966*, as amended, the *Archaeological and Historic Preservation Act (AHPA) of 1974*, the *Archaeological Resources Protection Act (ARPA)*, and the *Native American Graves Protection and Repatriation Act (NAGPRA) of 1990*. In addition, the *Antiquities Act of 1906*, the *Historic Sites Act of 1935*, and the *American Indian Religious Freedom Act of 1978* also protect historical, architectural, archaeological, and cultural resources.

Section 106 of the NHPA of 1966, as amended, requires federal agencies to take into account the effects of their undertakings on historic properties and determine if any properties in, or eligible for inclusion in, the National Register of Historic Places (NRHP) are present in the area. In addition, it affords the Advisory Council on Historic Preservation a reasonable opportunity to comment. The historic preservation review process mandated by Section 106 is outlined in regulations issued by the council.

The ARPA is triggered by the presence of archaeological resources on federal or Indian lands. The AHPA describes the process when consultation with resource agencies indicates that there may be an impact on significant scientific, prehistoric, historic, archaeological, or paleontological resources. The process provides for the preparation of a professional resource survey of the area. Should the survey identify significant resources, the National Register process described above will be followed. Should the survey be inconclusive, a determination is made whether it is appropriate to provide a commitment to halt construction if resources are recovered, in order for a qualified professional to evaluate their importance and provide for data recovery, as necessary.

The NAGPRA is triggered by the possession of human remains or cultural items by a federally funded repository or by the discovery of human remains or cultural items on federal or tribal lands and provides for the inventory, protection, and return of cultural items to affiliated Native American Groups. The Act includes provisions that, upon inadvertent discovery of remains, the action will cease in the area where the remains were discovered and the appropriate agency will be notified.

The *Antiquities Act of 1906* was the first general law providing protection for archaeological resources. It protects all historic and prehistoric sites on federal lands and prohibits excavation or destruction of such antiquities without the permission of the Secretary of the department having jurisdiction.

The *Historic Sites Act of 1935* declares as national policy the preservation for public use of historic sites, buildings, objects, and properties of national significance. It gives the Secretary of the Interior authority to make historic surveys, to secure and preserve data on historic sites, and to acquire and preserve archaeological and historic sites. This Act also establishes the National Historic Landmarks program for designating properties having exceptional value in commemorating or illustrating the history of the United States.

The *American Indian Religious Freedom Act of 1978* requires consultation with Native American groups concerning proposed actions on sacred sites, on federal land, or affecting access to sacred sites. It establishes federal policy to protect and preserve for American Indians, Eskimos, Aleuts, and Native Hawaiians their right to free exercise of their religion. It allows these peoples to access sites, use and possess sacred objects, and freedom to worship through ceremonial and traditional rites. The Act requires federal agencies to consider the impacts of their actions on religious sites and objects that are important to Native Americans regardless of the eligibility for the NRHP. Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments*, and the Presidential Memorandum of April 29, 1994, *Government to Government Relations with Native American Tribal Governments*, outline the government-to-government consultation process between the federal agency and the potentially affected tribe.

Development of projects would affect a property that is on or eligible for inclusion in the NRHP if it has the potential to alter the characteristics of the property which make it eligible for listing. Federal agencies can make one of three types of "effects findings" for an action: "no properties affected," "no adverse effect," and "adverse effect." The level of finding depends upon how severely a project would alter the characteristics of a property that make it eligible for the NRHP. Although the FAA works closely with the State Historic Preservation Officer (SHPO) and/or the Tribal Historic Preservation Officer (THPO), the FAA is ultimately responsible for the effect decision, not the SHPO or THPO.

The Section 106 consultation process includes consideration of alternatives to avoid adverse effects on National Register listed or eligible properties; of mitigation measures; and of accepting adverse effects. The FAA makes the final determination on the level of effect, and advice from the SHPO/THPO may assist the FAA in making that determination.

As discussed within Chapter One, no cultural or historic resources have been identified on existing airport property; therefore, development within the existing property boundaries of the airport will likely not impact historic, architectural, or cultural resources. As property is acquired at the airport and development is undertaken, cultural resource surveys will likely be needed to determine potential impacts. Projects which are being undertaken on previously undisturbed land have a higher likelihood of impacting these resources; therefore, the development of the MALSR system and the west side hangar facilities may require field surveys prior to development.

LIGHT EMISSIONS AND VISUAL EFFECTS

Airport lighting is characterized as either airfield lighting (i.e., runway, taxiway, approach and landing lights) or landside lighting (i.e., security lights, building interior lighting, parking lights, and signage). Generally, airport lighting does not result in significant impacts unless a high intensity strobe light, such as a Runway End Identifier Light (REIL), would produce glare on any adjoining site, particularly residential uses.

Visual impacts relate to the extent that the proposed development contrasts with the existing environment and whether a jurisdictional agency considers this contrast objectionable. The visual sight of aircraft, aircraft contrails, or aircraft lights at night, particularly at a distance that is not normally intrusive, should not be assumed to constitute an adverse impact.

It is not anticipated that the proposed airport development will result in significant lighting or visual impacts, with the exception of the MALSR installation. The MALSR installation will cross through an area which is currently in an undeveloped, "natural" state. The MALSR will result in the installation of flashing lights on stands. These lights may be visible to some of the homes located south of the airport. The remaining proposed airport development is planned to occur in areas which are either already developed for aviation purposes (east) or is buffered from residences through the presence of trees and the 100-year floodplain (west).

SOCIOECONOMIC, ENVIRONMENTAL JUSTICE, AND CHILDREN'S HEALTH AND SAFETY RISKS

Socioeconomic impacts known to result from airport improvements are often associated with relocation activities or other community disruptions, including alterations to surface transportation patterns, division or disruption of existing communities, interferences with orderly planned development, or an appreciable change in employment related to the project. Social impacts are generally evaluated based on areas of acquisition and/or areas of significant project impact, such as areas encompassed by noise levels in excess of 65 DNL.

Executive Order 12898, *Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations,* and the accompanying Presidential Memorandum, and Order DOT 5610.2, *Environmental Justice*, require FAA to provide for meaningful public involvement by minority and low-income populations as well as analysis that identifies and addresses potential impacts on these populations that may be disproportionately high and adverse.

Pursuant to Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks,* federal agencies are directed to identify and assess environmental health and safety risks that may disproportionately affect children. These risks include those that are attributable to products or substances that a child is likely to come in contact with or ingest, such as air, food, drinking water, recreational waters, soil, or products they may be exposed to.

The thresholds of significance for this impact category are reached if the project negatively affects a disproportionately high number of minority or low-income populations or if children would be exposed to a disproportionate number of health and safety risks. Significant socioeconomic impacts would result if an extensive number of residents need to be relocated and sufficient replacement housing is unavailable; if extensive relocation of business is required and this relocation would create a severe economic hardship for the affected communities; if disruptions of local traffic patterns would substantially reduce the level of service of the roads serving the airport and the surrounding community; or, if there would be a substantial loss in the community tax base.

It is not anticipated that the proposed airport development projects would result in significant impacts within this impact category. The airport is not located within an area which would be considered an "environmental justice" area; no residences or businesses are proposed for acquisition; and, potential risks to children from the development of the airport will be minimized through the use of standard security measures such as fencing and locks on cabinets or structures which contain hazardous materials.

WATER QUALITY

The *Clean Water Act* provides the authority to establish water quality standards, control discharges, develop waste treatment management plans and practices, prevent or minimize the loss of wetlands, and regulate other issues concerning water quality. Water quality concerns related to airport development most often relate to the potential for surface runoff and soil erosion, as well as the storage and handling of fuel, petroleum products, solvents, etc.

Water quality regulations and issuance of permits will normally identify any deficiencies in the proposed development with regard to water quality or any additional information necessary to make judgments on the significance of impacts. Difficulties in obtaining needed permits for the project, such as National Pollutant Discharge Elimination System (NPDES) or Section 404 permits, typically indicate a potential for significant water quality impacts.

Two creeks which would likely be deemed jurisdictional by the U.S. Army Corps of Engineers are present within the proposed development areas of the runway extension and MALSR installation. Line Creek is located south of the airport and bisects the MALSR system. A tributary to Fish Creek parallels the airport's northern boundary and is contained within the runway safety area of the extended runway. Further analysis is needed to assess potential impacts to these water resources.

WETLANDS

The U.S. Army Corps of Engineers (COE) regulates the discharge of dredged and/or fill material into waters of the United States, including adjacent wetlands, under Section 404 of the *Clean Water Act*.

Wetlands are defined by Executive Order 11990, *Protection of Wetlands*, as those areas that are inundated by surface or groundwater with a frequency sufficient to support, and under normal circumstances does or would support, a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Categories of wetlands include swamps, marshes, bogs, sloughs, potholes, wet meadows, river overflows, mud flats, natural ponds, estuarine areas, tidal overflows, and shallow lakes and ponds with emergent vegetation. Wetlands exhibit three characteristics: hydrology, hydrophytes (plants able to tolerate various degrees of flooding or frequent saturation), and poorly drained soils.

As outlined within FAA Orders 1050.1E and 5050.4B, a significant impact to wetlands would occur when the proposed action causes any of the following.

- The action would adversely affect the function of a wetland to protect the quality or quantity of municipal water supplies, including sole source, potable water aquifers.
- The action would substantially alter the hydrology needed to sustain the functions and values of the affected wetland or any wetlands to which it is connected.
- The action would substantially reduce the affected wetland's ability to retain floodwaters or storm-associated runoff, thereby threatening public health, safety, or welfare.
- The action would adversely affect the maintenance of natural systems that support wildlife and fish habitat or economically important timber, food, or fiber resources in the area or surrounding wetlands.
- The action would be inconsistent with applicable state wetland strategies.

As described within Chapter One, and depicted on **Exhibit B1**, a number of potential wetland areas are present on, and in close proximity to, airport property. Development of the MALSR and the proposed runway extension may impact these resources; therefore, further field studies and analysis are needed to assess potential impacts.

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